4.0 Existing Conditions, Impacts, and Mitigation Measures

4.1 Earth

4.1.1 Existing Conditions

4.1.1.1 Geology

Project Area

The proposed location of the Starbuck Power Project is on the Columbia Plateau, a broad expanse of land in eastern Washington and the northernmost part of eastern Oregon that is underlain by a series of layered basalt flows known as the Columbia River Basalt Group. These lava flows, which cover over 55,000 square miles in eastern Washington, northeastern Oregon, and Idaho, erupted from linear vents in the southeastern corner of Washington and adjacent areas of Oregon and Idaho between 17 and 6 million years ago.

Over 50 different major lava flow units have been identified within the Columbia River Basalt Group. Their cumulative thickness ranges from over 12,000 feet in the Pasco Basin to less than a few hundred feet along the margins of the Columbia Basin. Individual flows range from a few inches thick to over 300 feet thick, and most flows range from about 90 to 120 feet thick. Relatively thin sedimentary interbeds occur between some of the flows as a result of fluvial deposition that occurred between eruptions. These sediments are most often thin seams of clay or silt, although in some places sand and gravel are present instead.

Most of the surface of the basalt in the eastern part of the region has a mantle of loess (wind-deposited silt) known as the Palouse Formation. This loess, which is locally more than 200 feet thick, ranges in age from Pleistocene (ice age) to Holocene (recent). Much of this silt was derived from the Pasco Basin and was carried to the east and northeastward by prevailing winds. The rolling topography typical of the area south of the Snake River is largely the result of local variations in the thickness of this loess.

Glacial activity during the Pleistocene disrupted normal drainage patterns on the Columbia Plateau and resulted in the catastrophic Missoula Floods that surged southwestward across the region as recently as about 13,000 years ago. These enormous floods removed much of the loess cover and scoured the underlying basalt to form the channeled scablands that extend northward from the mouth of the Palouse River to near Spokane. River gravel deposits accumulated in these channels as the floodwaters subsided, and alluvium has subsequently been deposited along the courses of major streams. This material consists primarily of redeposited loess and basaltic sand and gravel.

The project area is located within the Palouse Slope structural subprovince of the Columbia Basin. The basaltic bedrock underlying this area is slightly deformed, with a few minor faults and broad, low-amplitude northwesterly trending folds on an otherwise gently westward dipping paleoslope. The closest known fault to the site is located about 2 miles to the north. This high-angle northwest-trending fault, known as the Lyons Ferry fault, offsets the Miocene Grande Ronde Basalt, but does not appear to have displaced the overlying Quaternary sediments. The closest fault with suspected Quaternary offset is the Central Ferry fault, about 12 miles to the east along the Snake River (Reidel et al. 1994). Because of the relatively old age of displacement (greater than 10,000 years) and the lack of earthquakes historically associated with this fault, it is not considered capable of generating earthquakes. The Wallula fault system, located approximately 45 miles south-southwest of the plant site, and the Hite fault, located approximately 40 miles southeast of the plant site, are the closest faults known to be active. Evidence exists of surface displacement in Holocene time along these faults, and either the Wallula or the Hite fault may have been the source of the Milton Freewater Earthquake of 1936. This earthquake is the largest earthquake to have occurred on the Columbia Plateau in its history. The quake had a magnitude of 5.75, a maximum epicentral intensity of VII, and a felt area of over 100,000 square miles.

Based on felt reports dating back to 1850 and seismograph records since 1969, the site area itself has been essentially aseismic in historic time. The closest recorded event, a magnitude 3.0 earthquake, had an epicenter about 15 miles away from the proposed plant site. A geological and seismological review in 1982 for Lower Monumental Lock and Dam and Little Goose Dam predicted that the maximum potential earthquake on the Wallula fault system would produce an attenuated bedrock acceleration of 0.10 g at both of these dams (Corps 1982). Since the Starbuck area has a similar geologic setting to these dams and lies at a comparable distance from the fault system, an anticipated maximum bedrock acceleration on the order of 0.10 g from this fault zone is also reasonable for the Starbuck Power Project. A more recent nationwide probabilistic assessment of earthquake hazards (Frankel et al. 1996) predicts that there is a 10% chance in 50 years (roughly a 500-year event) of an acceleration exceeding 0.07 g for a “rock” site. Although this probabilistic value does not take into consideration site-specific conditions, it does provide a first-order assessment of the seismic hazard at the site.

Generation Plant

The proposed plant site is situated on a gravel bar that was deposited along the Snake River approximately 13,000 years ago (Carson and Pogue 1996). This bar was deposited by floodwaters that backed up into the Snake River valley from the confluence of the Palouse and Snake Rivers during the last of the catastrophic Lake Missoula floods. Subsurface information from the south end of the property indicates that this deposit consists of two main layers: an upper 50-foot stratum of sandy gravels and cobbles with a trace to some silt and minor boulders; and an underlying 30-foot stratum that rests on basaltic bedrock and consists of boulders, cobbles, gravel and sand that are cemented by lime deposits (Black & Veatch 2000). At the northwest end of the site the bar deposit is considerably thicker. A geologic log associated with a domestic water well drilled in the area indicates that least 193 feet of coarse gravelly sediments overlie the basalt bedrock. A geologic cross section

(Figure 4.1-1) shows the relationship of the gravel bar to the Snake River valley and the underlying bedrock.

The basaltic bedrock underlying the plant site and forming the walls of the Snake River Canyon to the north and south consists of lava flows of the Grande Ronde Basalt. This basalt is the most abundant and widespread formation of the Columbia River Basalt Group. It consists of about 120 individual flow units and makes up about 90% of the total volume of the Columbia River Basalt Group. The thickness of the basalt below the site is not known, but is likely on the order of 1,000 feet.

The only other major geologic unit in the immediate site vicinity is a sand and gravel deposit that is exposed on the slope to the south of the site. As with the gravel bar deposit underlying the site, these sediments were also deposited during the Missoula Floods. They differ from the bar deposit in that they are typically finer-grained and were deposited in protected places on the canyon walls.

Water Pipeline

The proposed route for the water pipeline primarily follows the abandoned Union Pacific Railroad grade from the town of Starbuck to the plant site. Over most of this distance, the pipeline would be embedded in fill material originally imported for construction of the railroad. Although the thickness and composition of this fill has not yet been investigated, its elements most likely include a predominance of sand- and gravel-sized crushed rock with some silt matrix.

Beginning in Starbuck, the first 2.5 miles of the abandoned railroad grade is situated on alluvial deposits of the Tucannon River valley. This unconsolidated alluvium is comprised primarily of gravel, sand, silt, and silty basalt rubble. Farther downstream the pipeline would leave the abandoned right-of-way, extend to SR 261, and cross the Tucannon River on the SR 261 bridge. After crossing the river, the alignment would return to the railroad right-of-way along the base of the west wall of the Tucannon River valley. Here, a veneer of Missoula Flood gravels locally underlies the railroad grade, but these gravels appear to be founded primarily on lava flows of the Grande Ronde Basalt. The railroad grade continues along this bedrock bench for about 1 mile northward to the confluence of the Tucannon and Snake Rivers, and then northwestward along the Snake River until it reaches the terrace where the site is located. For the remaining 2 miles to the plant site, the pipeline would likely parallel the active Union Pacific Railroad and would be located in the coarse sands and gravels, cobbles, and boulders of this backwater Missoula Flood deposit.

4.1.1.2 Soil

Generation Plant

The near-surface soils in the vicinity of the plant site have been mapped and described in the Soil Survey of Columbia County, Washington (USDA 1973) as Stratford Series soils. As seen in test trenches excavated on the site, these soils consist of well-drained, stony to very

stony silt loam. A typical Stratford Series soil profile consists of a surface layer of grayish brown, very stony silt loam to a depth of 6 inches, underlain by a dark brown, very stony silt loam subsoil to a depth of 13 inches. The substratum, to a depth of 24 inches, is pale brown gravelly loam, and below this loam to a depth of 60 inches is loose, coarse-sand gravel, cobblestones, and boulders.

Above the coarse gravels, cobblestones, and boulders, the Stratford Series soils have a moderate permeability, and the available water capacity is moderate to moderately high. Runoff is slow to medium, and the erosion hazard is slight to moderate, depending on the slope of the ground surface. The soil profile was developed on flat to gently sloping, coarse-grained glaciofluvial deposits that are largely free draining.

Water Pipeline Route

The water pipeline between Starbuck and the plant site would be constructed primarily on the abandoned railroad grade and would be buried in fill materials installed for construction of the railroad. However, some areas of the railroad grade may have only a veneer of ballast overlying bedrock.

Although the exact location where the water pipeline would enter the plant site has not yet been identified, between the railroad bed and the site the pipeline would be excavated into Stratford Series soils, which were described previously in this section.

4.1.1.3 Topography and Unique Features

The proposed Starbuck Power Project would be located in the lower Snake River canyon, with the plant site located about 1.5 miles upstream of the confluence of the Snake and Palouse Rivers. This area lies in the Walla Walla Plateau section of the Columbia Plateau physiographic province. This part of the plateau slopes gently northwestward away from the Blue Mountains to the southeast. The area to the south and east of the site is characterized primarily by a rolling, maturely dissected upland surface, which is developed on loess. To the northwest, along the Palouse River, the gentle rolling landscape gives way to scabland topography created when the loess was stripped away during the catastrophic Missoula Floods, leaving the underlying basaltic bedrock exposed.

The Snake River and its two main tributaries, the Tucannon and Palouse Rivers, drain the region. These three rivers occupy steeply incised canyons, cut to depths of 1,000 feet or more into the Columbia River Basalt bedrock. Most of the smaller streams in the region are intermittent, flowing only during periods of rainfall or melting snow. In the vicinity of the plant site, the Snake River is impounded by Lower Monumental Dam, approximately 20 miles downstream. This impoundment, known as Lake Herbert G. West, floods not only the Snake River Canyon but also the mouths of the Palouse and Tucannon Rivers. About 8 miles upstream from the site is Little Goose Dam, which impounds Lake Bryan. This lake is about 98 feet above the normal pool elevation of Lake Herbert G. West.

Generation Plant

The proposed plant site is on a terrace about 200 feet above the south bank of the Snake River. The highest part of the terrace, at an elevation of approximately 730 feet above mean sea level (MSL), runs along the edge of a steep bluff overlooking the river. To the northeast, the bluff drops abruptly to the shore of Lake Herbert G. West at a pool elevation of approximately 540 feet MSL. The terrace surface slopes southwestward away from the bluff to an elevation of about 610 feet MSL along its southwestern edge in the vicinity of the Union Pacific Railroad tracks. Southwest of the tracks, the terrace abuts a steep bedrock escarpment that forms the upper canyon wall of the Snake River Canyon. This steep canyon wall rises to elevations of over 1,000 feet MSL adjoining the plant site (see Figure 4.1-1).

The topography of the SPC property ranges from gently sloping and undulating on the northwestern two-thirds of the 100-acre parcel, to moderately sloping and incised on the southeastern third. Whereas no significant surface drainage features characterize the northwestern part of the site, several ravines drain the more steeply sloped southeastern area southward toward SR 261. The Columbia County Grain Growers grain elevators are located southeast of the proposed plant site at an elevation of approximately 630 feet MSL.

As noted previously, the terrace where the site is located is a large gravel bar deposited by catastrophic floods released from Glacial Lake Missoula. These enormous ice-age floods, resulting from repeated failures of a huge ice-dammed lake, swept across northern Idaho, through the Spokane Valley, southwestward across eastern Washington, through the Columbia Gorge, and out into the Pacific Ocean. The gravel bar underlying the site, and a larger bar along the Snake River immediately upstream of the Tucannon River confluence, are both unusual because they were deposited from sediment-laden flood waters that flowed *up* the Snake River Canyon, probably during the more recent of the Missoula Floods. The topographic undulations in the northwestern part of the property are giant ripples whose size and asymmetrical shapes indicate that they were deposited by a tremendous volume of floodwater flowing up the Snake River Canyon.

The U.S. Geological Survey is currently considering the establishment of viewing areas on the Columbia Plateau where the public can observe Missoula Flood features. The giant ripple marks preserved on the SPC property are not readily obvious to an untrained observer, and they are not as well developed as at other locations on the Columbia Plateau. Nevertheless, they are unusual features that are instructive in understanding the magnitude of the floods, and the site is readily accessible for viewing from the highway.

Water Pipeline Route

The proposed 4-inch-diameter water pipeline that would supply the Starbuck plant would be constructed primarily along a 6-mile length of abandoned Union Pacific Railroad grade between the Town of Starbuck and the site. This alignment would have an average drop of about 6 feet per mile along the railroad grade, allowing for gravity flow from the town through the point where the pipeline would extend from the railroad and to the site.

For most of its run, the water pipeline would be embedded in the abandoned railroad grade. The only exceptions currently anticipated include a short connection from the new well and

pumping station to the railroad grade, a 1-mile section where it would parallel the active railroad, and a section of approximately 1,500 feet from the railroad right-of-way to the plant site. The abandoned railroad grade parallels SR 261 for most of the distance from Starbuck to the site. Leaving town, the grade traverses the northeast side of the Tucannon River valley floor for about 2 miles, crossing at least two small stream channels that drain the steep slope to the northeast. The route then crosses the Tucannon River and floodplain along an embankment section and bridge. In this area the pipeline would veer from the railroad to cross the floodway along SR 261. The pipeline would rejoin the railroad grade on the southwest side of the Tucannon Valley, where it would follow along a narrow terrace or rock cut near the base of the steep canyon wall. This section of the railroad grade crosses at least four small streams on embankments built over culverts before reaching the confluence of the Tucannon and the Snake Rivers. Upon reaching the Snake River Canyon, the railroad grade veers northwestward and continues for another 2,000 feet along a narrow shelf at the base of the steep canyon wall.

Beginning about 1 mile southeast of the site, the pipeline alignment traverses a low-lying area along the back of the gravel terrace, near the foot of the steep canyon wall. Through much of this section, the railroad grade is elevated above a low-lying area and crosses at least two small stream channels. The location has not yet been determined where the pipeline would leave the railroad grade and enter the site. However, this section of the pipeline would extend under the active Union Pacific Railroad tracks and SR 261, and upslope to the plant.

In addition to the bridge crossing of the Tucannon River, the railroad grade crosses at least eight intermittent streams between Starbuck and the plant site. These crossings have not been closely surveyed in developing this Environmental Assessment; however, culverts have been installed beneath the railroad grade at these crossings to allow passage of intermittent streamflow.

4.1.1.4 Erosion

Generation Plant

Unconsolidated, coarse-grained granular deposits that are moderately vegetated with grasses underlie the proposed generation plant site. These site soils are considered slightly to moderately to erodible, based on their composition and lack of compaction. However, because of their relatively coarse grain size, these soils are not susceptible to wind erosion. Similarly, erosion by surface runoff is largely negligible because of the high permeability of the soils and the relatively low relief of the site. Such high permeability allows for rapid infiltration of precipitation and a general absence of surface runoff. This condition is evidenced by the lack of natural drainage channels over most of the site.

There are, however, a series four small ravines in the southeastern part of the site that are incised in their lower reaches as much as 8 to 10 feet into the terrace surface. These ravines may be ancient landscape features that formed during the waning stages of the gravel bar deposition, or they may be modern channels that have been eroded by runoff during periods of excessive precipitation.

Water Pipeline Route

The proposed water pipeline will be embedded in an abandoned railroad grade to minimize settlement and erosion. The grade itself appears to be constructed of compacted, crushed rock. In areas where the grade crosses intermittent side streams, culverts were installed through the soil embankments to reduce the potential for washouts. In lowland areas along the Tucannon River valley, the grade was elevated above likely flood levels to avoid inundation and erosion of the tracks.

The railroad grade is no longer maintained by the railroad, and its overall condition with respect to erosion is unknown. However, a recent partial reconnaissance of the tracks and a review of aerial photographs taken in 1974 did not reveal any evidence of excessive erosion along the railroad right-of-way.

4.1.2 Environmental Impacts of the Proposed Project

4.1.2.1 Construction

Geology and Soils

Generation Plant

The impact of construction on plant site geology and soil conditions would primarily be related to site grading, grubbing, and foundation preparation. Site preparation would require grubbing, rough grading, excavating, filling, tile field and utility installation, and final grading. About 40 acres of the SPC property would require grading to accommodate plant structures. Specifically, the area around the generation building would be graded to an elevation of approximately 708 feet above MSL using a balanced cut-and-fill operation. Preconstruction elevations range from about 720 feet MSL on the northern portion of the site to approximately 690 feet MSL on the southeast portion. The excavated soils would be sorted to remove boulders and then used as nonstructural fill. The boulders would be used onsite as nonstructural fill. Crushed rock would probably be imported for surfacing, and soil would likely be trucked to the site for use as structural fill. If these materials are required, they would likely be imported from a permitted offsite borrow source, as yet unidentified.

A preliminary site grading and drainage plan for the generation plant is shown in Figure 4.1-2. This figure shows the natural topography as well as the conceptual site layout, regraded topography, and surface features, including a retention pond. Based on this drawing, cuts of up to 16 feet would be required on the northern part of the plant site. Fills of up to 14 feet would be required near SR 261.

In addition to modifications to the plant site, areas adjoining the site would probably be grubbed and graded for use as construction laydown areas. After construction, these areas would be returned to their preconstruction state and reseeded with grasses common to the area.

The use of heavy equipment for grubbing and grade changes would result in densification of the granular soils. This result would lower the permeability and increase the erodibility of site soils during construction, and these impacts are addressed later in this section. Plant construction is not expected to produce any other adverse impacts to site geology and soil conditions.

Indirect impacts could be associated with the use of borrow materials for structural fill. However, such materials would likely be imported from a nearby permitted source. Volumes are not expected to be large, and the potential for indirect impacts is not considered significant.

Based on the historical seismicity and limited information on site subsurface conditions, the seismic hazard to the proposed generation plant appears to be limited to moderate levels of ground shaking. Fault rupture does not appear to be a concern because of the lack of known faults, and ground failure due to liquefaction or lateral spreading is unlikely given the relatively small earthquakes characteristic of the area and the deep water table underlying the site.

Water Pipeline

The Jones & Stokes team has not surveyed the entire proposed pipeline route to determine the existence, nature, or extent of any adverse impacts that could result from construction of the water pipeline. Nevertheless, potential environmental impacts can be identified, based on observed and assumed conditions. First, excavation of the trench for burial of the pipeline would result in ground disturbance, and that disturbance would change the density and permeability of the soils. Trench materials can be expected to expand somewhat when they are removed from the trench, leaving excess material after the pipeline has been embedded and the trench has been backfilled. However, this condition is not expected to result in a significant impact on geology or soils.

Since much of the pipeline trench would likely be excavated in railroad ballast and underlying fill soils, this excavation could encounter contaminated soils. Potential contamination could have resulted from oil used in track maintenance, creosote used in rail ties, release of contaminants from trains, or contaminated fill material used to construct the railroad grade. An environmental evaluation of these fill soils would be needed prior to construction to provide for the health and safety of workers and to determine an appropriate disposition for any contaminated soils that are encountered.

A geotechnical exploration should also be conducted along the railroad grade to determine subsurface conditions that will be encountered during placement of the water pipeline. In some areas, bedrock excavation may be required to bury the pipeline below the railroad grade. In this eventuality, consideration should be given to viable excavation techniques such as blasting, or to the feasibility of relocating the alignment. Both of these alternatives could have adverse impacts that would warrant evaluation when information on conditions along the alignment is available.

Topography and Unique Features

Generation Plant

Approximately 40 acres of the site would be graded to accommodate construction of the generation plant. Cuts would be as deep as 16 feet, whereas up to about 14 feet of fill would be placed in some areas along the southern boundary of the fill pad. Embankments would be constructed on no more than 2:1 (horizontal to vertical) slopes. A few small ravines on the southeast site of the site would be filled for construction of a retention pond. These changes in site topography would not result in a significant impact on topography or unique features.

The terrace where the site is located is a unique topographic feature. It was formed by backwater flooding of the Snake River Canyon during a catastrophic glacial breakout flood from glacial Lake Missoula about 12,700 years ago. This terrace is one of several places on the Columbia Plateau where topographic evidence of catastrophic backwater flooding has been preserved. This evidence includes asymmetrical giant ripple marks, which are indicative of upstream movement of a vast quantity of flood water. These ripple marks are best expressed on the northwestern part of the 100-acre site, in an area beyond the proposed location for plant construction. Use of this northwestern area as a laydown or fabrication area for the plant site or its associated switchyard would likely obscure or obliterate part of this unique topographic feature.

Water Pipeline

No adverse impacts to topographic or unique features are anticipated as a result of construction of the water pipeline. The pipeline would be buried primarily along an existing railroad grade that was built in the 1960s, and the landscape would be returned to preconstruction conditions.

Erosion

Generation Plant

Earthwork required for construction of the generation plant would increase the erodibility of site soils. Grubbing would remove protective vegetation and disaggregate surface soils, making them more susceptible to erosion by wind, water, and gravity. Site excavation and filling would strip away topsoil, rearrange the distribution and slopes of site soils, and greatly modify drainage patterns. Construction of the plant would also increase and redirect runoff. Unchecked, all of these changes would have the potential significantly to increase erosion at and near the site.

In order to control erosion, numerous measures have been included in the overall project design, and these measures address temporary construction issues as well as permanent provisions. SPC has developed a preliminary Erosion and Sediment Control Plan, Site Construction Plan, and Stormwater Management Plan to minimize erosion during both construction and operation of the facility (see Section 4.3.2.1 for additional details). The

Conceptual Erosion and Sediment Control Plan, graphically portrayed in Figure 4.1-3, complies with Washington State regulations for construction stormwater pollution prevention. The plan provides for use of silt fences to control runoff, stormwater drainage during and after construction, reseeding of exposed surfaces, and ongoing inspection and maintenance until all areas are stabilized. The Construction Plan specifies the order of construction activities to ensure that protective measures are in place before disruptive activities are initiated. The Stormwater Management Plan, which was developed following EPA guidelines, provides for control of site runoff during construction and operation of the site.

With implementation of these measures, the increase in erosion during construction would not result in a significant impact.

Water Pipeline

Excavated soils that are stockpiled during construction of the pipeline trench would be susceptible to erosion until they are returned to the excavation. This exposure could result in release of sediment to the Tucannon River, Snake River, or to intermittent stream channels that are crossed by the pipeline alignment. In order to reduce this potential, silt fences would be employed to control erosion of the soils. In susceptible areas the excavated soils could also be covered if there was a threat of rainfall. After the trenches have been backfilled the soil would be reseeded to reduce potential erosion of the disturbed soils. As a result, construction of the water pipeline would not result in a significant impact on erosion.

4.1.2.2 Operation and Maintenance

During operation, runoff at paved areas on the plant site would be routed through stormwater control facilities. Areas that are not paved or covered by buildings would be seeded, primarily with native species. After the water pipeline is installed, backfilled areas would revegetated as appropriate. As a result, during operation of the project there would not be any significant impacts on geology, soils, topography, unique features, or erosion.

4.1.3 Potential Mitigation Measures

4.1.3.1 Generation Plant

In addition to the protection measures briefly described above, the following mitigation measures should be included in the proposed project:

- Slopes should be carefully prepared and attention should be given to the placement and compaction of fill in order to mitigate potential erosion in areas to be graded.

- Runoff and sedimentation and erosion control plans should be incorporated in the construction process and the plant design.

- Silt fences should be installed and maintained until other erosion protection measures can be implemented.
- Disturbed areas should be reseeded as soon as feasible.
- Exposed slopes should be protected from rainfall and runoff by installation of erosion-protective coverings until permanent protection can be installed.
- Consideration should be given to restricting the use of the northwestern half of the property in order to preserve the unique topographic expression of the Missoula Floods.
- A geotechnical investigation of the site and the natural gas pipeline route would be required to evaluate foundation conditions, determine seismic design criteria, assess the suitability of site soils for structural fill, and provide information required to design the tile drain field.
- The site where construction and construction support activities would be performed should also be limited in area. This confinement would preserve the vegetation and topsoil over the majority of the 100-acre site and reduce the potential for erosion.
- Hydrostatic test water used to test the natural gas pipeline connection to the GT-NW mainline should be discharged into the retention pond.

4.1.3.2 Water Pipeline

A reconnaissance of the proposed pipeline alignment should be conducted before drawing conclusions as to what adverse impacts could result from construction of the pipeline. Once the proposed alignment and its design depth have been established, a subsurface investigation should be performed to evaluate (a) the geotechnical feasibility of excavating the pipeline trench, and (b) the potential for encountering contaminated soils along the railroad grade.

Measures would be required for control of sedimentation and erosion during pipeline construction. The pipeline trench backfill would also need to be compacted and regraded to approximate the current topography. Portions of the disturbed area would need reseeding to minimize the potential for erosion following construction.

The relatively small volumes of excess soils generated during pipeline installation would need to be removed and disposed in a landfill, spread along the alignment, or delivered to another site requiring fill materials. Any contaminated soils encountered would require proper handling and disposal in compliance with federal and state regulations. Protective measures would also be required for workers exposed to any such contamination.

If hydrostatic testing is used for the water pipeline, the test water should be discharged into the retention pond.

4.2 Air Quality

4.2.1 Existing Conditions

4.2.1.1 Climate

Columbia County is located in southeastern Washington State in the Columbia/Snake River Basin. Summers are warm and sometimes hot; winters are relatively mild, considering the latitude. The average year-round temperature is approximately 50°F. Temperatures above 95°F are most likely in the months of June and July, although temperatures in excess of 100°F have been recorded anytime between May and September. The absolute minimum and maximum temperatures measured in the area were –25 and 114°F, respectively. The average monthly precipitation ranges from 0.6 inches in July to 1.5 inches in May. The total average annual precipitation in the area is 14.3 inches, with a maximum annual precipitation of 18.6 inches. The maximum annual precipitation in a 24-hour period is 1.7 inches (Black & Veatch 2000).

4.2.1.2 Odor

The project site is currently pastureland adjacent to SR 261. There are no obvious sources of odor in the immediate vicinity of the project site. The Columbia County Grain Growers storage facility is located immediately south of the plant site, and there is a residence on the SPC property, north of the project footprint.

4.2.1.3 National Ambient Air Quality Standards

The State of Washington has adopted the National Ambient Air Quality Standards (NAAQSs) listed in Table 4.2-1. The NAAQSs include primary standards designed to protect public health and secondary standards designed to protect public welfare from impacts such as damage to property and vegetation. Natural gas combustion produces emissions of nitrogen oxides (NO_x), sulfur dioxide (SO_2), carbon monoxide (CO), and particulate matter (PM), as well as carbon dioxide (CO_2) and unburned hydrocarbons.

The Washington State Department of Ecology (Eastern Regional Office) has jurisdiction over air quality permitting in Columbia County for most projects. However, for projects under the jurisdiction of EFSEC, the U.S. Environmental Protection Agency (EPA) has delegated the responsibility for issuing air permits to EFSEC.

The Department of Ecology maintains a network of air quality monitoring stations in Eastern Washington. These stations sample air quality in areas that may have experienced higher levels of air pollution than other areas. There are currently three air quality monitoring stations in the Eastern Region: one each in Asotin, Benton, and Stevens Counties. There are no air quality monitoring stations near the project site in Columbia County.

Table 4.2-1. Ambient Air Quality Standards and Prevention of Significant Deterioration Increments

Pollutant	National Primary	National Secondary	State of Washington	Class I PSD Increments	Class II PSD Increments
Total Suspended Particulate Matter (TSP)					
Annual Geometric Mean			60 µg/m^3		
24-hour Average			150 µg/m^3		
Inhalable Particulate Matter (PM_{10})					
Annual Arithmetic Mean	50 µg/m^3	50 µg/m^3	50 µg/m^3	1 µg/m^3	17 µg/m^3
24-hour Average	150 µg/m^3	150 µg/m^3	150 µg/m^3	5 µg/m^3	30 µg/m^3
Inhalable Particulate Matter ($PM_{2.5}$)					
Annual Arithmetic Mean	15 µg/m^3	15 µg/m^3			
24-hour Average	65 µg/m^3	65 µg/m^3			
Sulfur Dioxide (SO_2)					
Annual Average	0.03 ppm		0.02 ppm	1 µg/m^3	20 µg/m^3
24-hour Average	0.14 ppm		0.10 ppm	5 µg/m^3	91 µg/m^3
3-hour Average		0.5 ppm		25 µg/m^3	512 µg/m^3
1-hour Average			0.40 ppm[a]		
Carbon Monoxide (CO)					
8-hour Average	9 ppm		9 ppm		
1-hour Average	35 ppm		35 ppm		
Ozone (O_3)					
1-hour Average[b]	0.12 ppm	0.12 ppm	0.12 ppm		
8-hour Average	0.08 ppm				
Nitrogen Dioxide (NO_2)					
Annual Average	0.05 ppm	0.05 ppm	0.05 ppm	1 µg/m^3	25 µg/m^3
Lead (Pb)					
Quarterly Average	1.5 µg/m^3	1.5 µg/m^3	1.5 µg/m^3		

µg/m^3 = micrograms per cubic meter; ppm = parts per million

Annual standards never to be exceeded; short-term standards not to be exceeded more than once per year unless otherwise noted.

(a) 0.25 not to be exceeded more than twice in 7 days

(b) Not to be exceeded on more than 1.0 days per calendar year as determined under the conditions of Chapter 173-475 WAC.

Based on air quality monitoring information collected over a period of years, EPA designates regions as "attainment" or "nonattainment" areas for particular pollutants. Attainment status is a measure of whether air quality in an area complies with the federal health-based ambient air quality standards shown in Table 4.2-1.

4.2.1.4 Existing Meteorology and Air Quality

Because of the rural nature of Columbia County and the lack of large industrial sources of pollutants, Columbia County is in attainment for all criteria pollutants.

There are no available meteorological data for areas near the plant site. SPC plans to install a meteorological tower at the site in early 2001 and would operate it for at least 1 full year.

4.2.2 Environmental Impacts of the Proposed Project

4.2.2.1 Construction

Generation Plant

Construction of the generation plant and associated facilities at the plant site, including the 200-foot-long natural gas pipeline, would generate air pollutants. Construction activities would occur at varying levels of intensity for 24 months; however, with the planned mitigation measures, offsite air quality impacts would not be significant.

A balanced cut-and-fill operation would be required to provide the desired grade and elevation. This activity would be completed early in the construction process. Dust generation would be controlled by spraying water at excavation and fill sites. This process is not expected to produce a significant amount of airborne dust. In summary, dust generated by excavation and grading activities would be minor and limited primarily to approximately 2 or 3 months of the cut-and-fill operation.

In addition, truck and equipment traffic across portions of the site that are not paved or covered with gravel during construction could generate dust. These areas would also be periodically sprayed with water to minimize dust release. The impact of this release of dust is expected to be highly localized, temporary, and not significant.

Some of the machinery (such as compressors and generators) and heavy equipment (such as loaders, bulldozers, and trucks) used to construct the facility would be powered by internal combustion engines. While such engines emit the byproducts of combustion, resulting offsite air quality impacts would not be significant.

Construction of the generation plant would also include activities that would potentially generate odors. If oil-based paints are applied to structures or equipment at the site, paint odors may be perceptible nearby. Some of the site would be paved with asphalt, and asphalt fumes may be perceptible for a short period during the paving operation. These impacts are

expected to be of short duration and are not significant since there are few people nearby who would notice a change in odor.

Water Pipeline

The water pipeline would be installed through excavation and burial of pipe along the selected route. This process would include typical construction activities such as excavation of the trench, installation of the pipeline, and trench backfilling. Minor amounts of dust would be generated during excavation and backfilling. Such impacts would be of short duration and not significant. Impacts would last only as long as the construction period, approximately 2 to 3 months. As at the plant site, the excavation area and backfill operations would include spraying with water to minimize dust release.

4.2.2.2 Operation and Maintenance

Based on modeling conducted by SPC's consultant, CH2M Hill, the proposed facility would result in emissions greater than the Prevention of Significant Deterioration (PSD) thresholds for NO_x, CO, SO_2, PM_{10} and volatile organic compounds (VOCs). Table 4.2-2 compares the proposed project's criteria pollutant emissions to the significant emission rates established for PSD permits.

Table 4.2-2. Starbuck Project Emissions and Significant Emission Rate

Pollutant	Proposed Project Emissions (tons/year)	Significant Emission Rate (tons/year)	Significance Criteria Exceeded
NO_x	410	40	Yes
SO_2	68	40	Yes
PM_{10}	359	15	Yes
VOC	210	40	Yes
CO	1466	100	Yes

The preliminary emission estimates shown in Table 4.2-2 assume that NO_x emissions are controlled using a combination of dry low-NO_x combustors. Dry low-NO_x combustors are designed to maintain a fuel-to-air ratio where the quantity of oxygen in the air introduced into the combustion process is just sufficient to allow the fuel to burn. This "lean" ratio results in a relatively cool combustion zone. NO_x is typically produced in high temperature zones; therefore, the lower temperature in the combustion zone would minimize NO_x production.

In addition to dry low-NO_x combustion, each heat recovery steam generator (HRSG) would be furnished with a complete selective catalytic reduction (SCR) system to control concentrations of NO_x generated by the combustion turbine and duct firing. Aqueous ammonia (NH_3) would be used in the SCR system for NO_x control.

The SCR catalyst reactor would be located in a temperature zone of the HRSG intended to optimize the performance of the catalyst at all normal operating loads and ambient temperatures. The rate of ammonia injection would be governed by the inlet NO_x concentration, as measured by a continuous emissions monitoring system (CEMS). Injections of ammonia would be adjusted at the lowest possible rate to maintain the required outlet NO_x concentration. The ammonia slip, or level of unreacted ammonia, from the SCR would be minimized through good operating practices and proper instrumentation.

As mentioned earlier, preliminary modeling indicates that even with dry low-NO_x combustion and SCR, emissions from the proposed facility would exceed the PSD significant emission rates for NO_x, SO_2, PM_{10}, VOC, and CO (Table 4.2-2).

CH2M Hill used dispersion modeling based on assumed meteorological data to determine whether or not the project would (1) cause exceedances of the state or national ambient air quality standards, and (2) result in a significant increase in ambient concentrations. These guidelines are delineated as the "Class I and II increments" by the PSD regulations.

Preliminary modeling results appear in Table 4.2-3. For the proposed turbine configuration, project impacts are below the PSD Class II increments and ambient air quality standards for all criteria pollutants except PM_{10}. The project also exceeds the PSD "air monitoring" significant impact level for SO_2, NO_2, and PM_{10}. These modeled exceedances indicate that air quality monitoring would be required for these pollutants.

Table 4.2-3. Starbuck Site Dispersion Modeling Analysis

	Modeled Concentration ($\mu g/m^3$)	Significant Impact Levels ($\mu g/m^3$)	Ambient Standard ($\mu g/m^3$)	Class II PSD Increment ($\mu g/m^3$)	Exceeds Standard or Increment
Sulfur Dioxide (SO_2)					
3-hour	26.9	25	1300	512	No
24-hour	12.0	5	365	91	No
Annual	3.1	1	80	20	No
Nitrogen Dioxide (NO_2)					
Annual	18.6	1	100	25	No
Carbon Monoxide (CO)					
1-hour	76.5	2000	40000	NA	No
8-hour	53.6	500	10000	NA	No
Particulate (PM_{10})					
24-hour	90.0	5	150	37	Yes
Annual	16.8	1	50	19	No
Ammonia					
24-hour	78.0	NA	100	NA	No

To date, no air modeling has been conducted to examine the project's impacts on Class I areas. The two Class I areas closest to the project site, and the only ones within 120 miles, are located in northeastern Oregon: The Eagle Cap Wilderness Area, located in the Wallowa Mountains, is approximately 72 miles south-southeast of the Starbuck site, and the Hells Canyon Wilderness Area is approximately 82 miles southeast of the Starbuck site.

Dispersion modeling conducted for the project employed a set of worst-case meteorological data in lieu of onsite data. Consequently, the modeling results are likely to show higher concentrations than would occur with actual onsite meteorological data. Based on the modeling results shown in Table 4.2-3, one or more of the following would likely be required to address the elevated PM_{10} concentrations:

- additional modeling using meteorological data collected onsite;
- more refined vendor estimates of PM_{10} emissions from the combustion turbines; or
- additional PM_{10} emission controls.

Unless SPC can demonstrate that the project would not result in exceedances of the PM_{10} increment, or reduced visibility to Class I areas, the project's impacts would be considered significant.

Cumulative impacts on visibility and PM_{10} deposition will be addressed by BPA in the cumulative impact analysis it will conduct for the Draft SEPA/NEPA EIS. As currently planned, BPA's analysis would address these impacts for all proposed and reasonably foreseeable power generation projects.

4.2.3 Potential Mitigation Measures

4.2.3.1 Construction

Dust from access roads, grading operations, and excavation activities would be controlled by applying gravel or paving the access roads, or by watering the roads as necessary. No additional mitigation measures have been identified.

4.2.3.2 Operation and Maintenance

In addition to the protection measures briefly described above, the need for mitigation for CO_2 production should be evaluated and, if appropriate, implemented.

4.3 Water Resources

4.3.1 Existing Conditions

4.3.1.1 Surface Water and Runoff

Generation Plant Site

Climate and Precipitation Patterns

The project site is located in eastern Washington and is considered arid. The average monthly precipitation ranges from 0.6 inches in July to 1.5 inches in May. The total average annual precipitation in the area is 14.3 inches, with a maximum annual precipitation of 18.6 inches. Maximum precipitation in a 24-hour period is 1.7 inches. (Black & Veatch 2000.)

Water Bodies at the Plant Site and Vicinity

The Snake River and one of its main tributaries, the Tucannon River, drain the Starbuck area. Other nearby streams are intermittent, flowing only during and immediately after rainfall and during snowmelt.

The project site is between SR 261 to the southwest and the Snake River to the northeast (see Figure 3-1). In the vicinity of the project site, the Snake River is also known as Lake Herbert G. West, a reservoir created by the Lower Monumental Dam. The State of Washington Department of Ecology classifies the Snake River as Class A (excellent) in the area adjoining the site. The Class A designation requires industrial use of this water to be compatible with other uses including drinking water, wildlife, and recreation.

The Snake River flows northwest in the vicinity of the project site and joins the Columbia River approximately 50 miles downstream. No other surface water exists at the site, except possibly during storm events. During storm events, four small ravines in the southern portion of the site direct surface runoff toward SR 261, as discussed below.

Site Topography and Runoff

Overall, the project site is slightly to moderately sloped, generally from north to south. The highest elevations are located near the bank of the Snake River and near the north end of the SPC property. The lowest elevations are near the south end of the proposed plant site location. Elevations in the area of the project footprint vary from 720 feet above mean sea level (MSL) in the north to 690 feet MSL in the south. To the south and east, elevations reach 600 feet MSL. (Black & Veatch 2000.)

The site is used as a grazing pasture, and vegetation on the site consists primarily of grasses. The horizontal distance between the nearest SPC property boundary and the Snake River is approximately 350 feet, and the vertical drop from the plant site to the normal river water level is approximately 150 feet (Black & Veatch 2000). The area to be developed for the generation facility (the project footprint) slopes away from the river—the highest elevations are located near the bank of the Snake River).

Precipitation on the site percolates through the soil or is directed toward the south end of the site by topography. Four small ravines in the southern portion of the project site collect precipitation and direct it to the southwest away from the Snake River and toward SR 261. The runoff is then directed under SR 261 via a 24-inch culvert and is allowed to disperse and percolate on the west side of SR 261. Based on the soil type, runoff is classified as slow to moderate (Black & Veatch 2000).

No surface water quality data are available for the project site. However, runoff could contain some suspended solids due to erosion and soil conditions at the site (Black & Veatch 2000).

Water Pipeline Route

The 6-mile-long water pipeline from the town of Starbuck to the plant site would be installed primarily within an abandoned railroad right-of-way. The railroad ballast appears to be intact and culverts pass through the ballast.

The water pipeline would begin in the town of Starbuck and head northwest along the abandoned right-of-way paralleling SR 261. For the first few miles, it is also parallel to the Tucannon River (Figure 3-6). Where it must cross the Tucannon River, the pipeline would be routed north from the abandoned right-of-way to SR 261, where it would run parallel to the roadway, then cross the river on the highway bridge. After crossing the river, the pipeline would be routed back to the abandoned right-of-way.

Several wetlands adjacent to the abandoned right-of-way may at times contain standing water (see Section 4.4 for discussion of wetlands). No surface water quality data are available for the abandoned right-of-way. However, runoff could contain some suspended solids due to erosion and soil and ballast conditions.

4.3.1.2 Floodplains

Generation Plant Site

According to FEMA maps, the plant site is not within the 100- or 500-year floodplains. Several dams control the elevation of the river in the vicinity of the project; river elevation normally fluctuates between 537 and 540 feet MSL (Black & Veatch 2000). The lowest point on the plant site is approximately 690 feet MSL, approximately 150 feet above the normal river level.

Water Pipeline

The water pipeline would be buried in the abandoned Union Pacific Railroad right-of-way between Starbuck and adjacent to the active portion of the railroad about a mile southeast of the plant site. The pipeline is not expected to be in direct contact with any surface water. At the Tucannon River crossing, the pipeline would be routed north from the abandoned right-of-way to SR 261, parallel the roadway, then cross the river on the highway bridge. After crossing the river, the pipeline would be routed back to the abandoned right-of-way. In the vicinity of the plant site, the pipeline route would extend northward from the abandoned right-of-way, passing under the active Union Pacific Railroad line and SR 261 to the plant.

About 2.5 miles of this alignment is located on or immediately adjacent to the eastern side of the alluvial floodplain of the Tucannon River. The adjoining areas include wetlands along the valley bottom. Based on the flood insurance rate map (FIRM) for Columbia County, Washington (FEMA 1988), parts of the alignment along the Tucannon River valley are within the 500-year flood boundary or within areas of the 100-year flood with average depths of less than a foot. Where the alignment crosses the floodway and 100-year floodplain of the Tucannon River, it would be situated on the highway embankment and bridge. The design flood for this bridge is not known, but it is likely that it was designed to accommodate the 100-year flood. In its ASC, SPC will identify the design limitations, if any, of the bridge regarding installation of the pipeline and the potential floodplain impacts.

The pipeline alignment along the west side of the Tucannon River and between the Tucannon River and the plant site would be situated on the abandoned railroad grade and well above the floodplain. This section of the railroad grade crosses several intermittent stream channels on embankments built across the channels; culverts through the embankments allow for passage of intermittent streamflow.

4.3.1.3 Groundwater

There are three main aquifers in the project area:

- an alluvial aquifer in the shallow granular alluvial deposits along the Tucannon River valley;
- an aquifer near the base of the flood gravels underlying the terrace where the plant site is located; and
- several deep regional bedrock aquifers within the Columbia River Basalt Group.

The alluvial aquifer is restricted to the Tucannon River valley floor. Based on the few wells drilled in this area, the alluvium is at least 35 feet thick and rests on basaltic bedrock. The water table in the alluvium is typically within about 10 feet of the ground surface and is hydraulically connected with the Tucannon River. Based on well logs from the Washington Department of Ecology (Ecology), there are no known wells that draw from this aquifer, with the possible exception of an old hand-dug well in the vicinity of Starbuck. This shallow

aquifer is recharged by precipitation and irrigation, and it presumably discharges to and is recharged from the river, depending on the season.

The aquifer in the flood gravels below the plant site is at a depth of 190 feet, based on the geologic log of the residential well drilled near the northwest end of the site. This groundwater elevation corresponds closely to the pool elevation of Lake Herbert G. West, about 1,000 feet north of the well, suggesting that it is hydraulically connected with the lake. This groundwater is likely to be restricted to the geographic extent of the terrace, although it may be in contact with a bedrock aquifer at essentially the same elevation. It is recharged by infiltration of precipitation through the terrace, seepage from the lake, and perhaps by discharge from the adjoining bedrock. The well log indicates that the aquifer is situated in highly permeable gravels; a pumping test in the well yielded 190 gallons per minute (gpm) with 10 feet of drawdown after 2 hours.

Groundwater in the Columbia River Basalt is the only available source of large quantities of good-quality water in the area. This water occurs at numerous horizons within the thick sequence of lava flows and is derived mainly from relatively thin, permeable flow-contact zones between thicker, less permeable parts of the flows. Several water-bearing zones within the basalt are used for water supply in the area, with most of the wells opened to more than one water-bearing zone.

The basalt aquifers are recharged mainly by infiltration of precipitation, both at the basalt surface and in surface and storm-runoff channels crossing the basalt. Most of the precipitation falls during the cooler seasons, when loss of water to evaporation and plant growth is relatively small and the opportunity for infiltration is enhanced. The thin rocky soils of the sparsely vegetated scablands to the north of the Snake River allow more rapid infiltration of precipitation than does the thicker loess soil in the project area. The Snake River may also recharge some of the deeper basalt aquifers in the area, although it probably serves as a discharge area to the relatively shallow basalt aquifers to the south of the river.

Although the basalt aquifers are capable of yielding large quantities of water to wells, they contain relatively small volumes of groundwater per unit volume of rock. As a result, heavy pumping can result in widespread drawdown through these aquifers. Considerable effort has been made in parts of the Columbia Basin to evaluate the impact of extraction on groundwater levels in the Columbia River Basalt Group. However, these studies have focused on areas to the north and west where there is considerably greater groundwater withdrawal; no published studies have evaluated long-term effects of groundwater withdrawal in Columbia County.

4.3.1.4 Public and Private Water Supplies

The town of Starbuck has two water supply wells. Both wells withdraw groundwater from basalt aquifers, one at a depth of 65 to 80 feet below ground surface, and the other from a depth of approximately 410 to 420 feet.

The town of Starbuck has a water right of 270 gallons per minute, or 432-acre feet per year maximum, for municipal use (Certificate G327838). Part of this water right dates back to

1965 (100 gpm), whereas the remainder was secured in 1985 and rewritten in 1999. Sharon Shantie, the City Clerk for Starbuck, indicated that the town uses approximately 15% of this water right on an annual basis, with the highest consumption rates during the summer.

According to well logs on file with Ecology, six other wells have been drilled in the vicinity of Starbuck and the plant site. One of these wells is a shallow hand-dug well in Starbuck that apparently was completed in 1928 by the Oregon-Washington Railroad and Navigation Company. It is not known whether this well is still in use.

Three other wells near Starbuck are deep bedrock wells located north of town along the Tucannon River valley. These wells were completed in 1992 and 1993 to depths of 150 to about 800 feet. A private party drilled them, apparently for a supply of irrigation water. The other two wells listed in Ecology files are on the terrace where the plant would be located. One is a residential/irrigation well located just outside the northwestern site boundary; the other is a Corps test well located about a mile northwest of the plant site. Both of these wells are completed in the flood gravel deposits.

There is also a water supply well at the grain elevator immediately southeast of the plant site. However, no information about this well was available in Ecology files.

4.3.2 Environmental Impacts of the Proposed Project

4.3.2.1 Proposed Protection Measures

SPC developed a draft Storm Water Pollution Prevention Plan (SWPPP) to address generation plant construction and operation activities. The SWPPP addresses temporary and permanent stormwater controls, vegetation practices, and site management of solid, liquid, and hazardous materials and wastes. The SWPPP also includes notification procedures for accidental spill and emergency response actions. We have assumed that the final SWPPP would include requirements for construction of the water pipeline.

Stormwater Best Management Practices

Best management practices (BMPs) such as good housekeeping measures, inspections, containment, and spill prevention practices would be used to limit contact between stormwater and potential pollutants:

- Storage areas for hazardous materials will be provided with secondary containment to ensure that spills in these areas do not reach surface waters.

- All onsite vehicles will be monitored for leaks and receive regular preventative maintenance. No “topping off” of fuel tanks will be allowed.

- Fueling and maintenance of vehicles will occur at least 150 feet from surface waters.

- Petroleum products will be stored in clearly labeled and tightly sealed containers or tanks. All quantities of petroleum products greater than 55 gallons will be stored within temporary lined containment dikes.

- Any contaminated soils will be removed and disposed of at an approved disposal site.

- All construction or temporary sanitary wastes will be collected and portable units will be maintained on a regular basis.

- All hazardous wastes will be disposed of according to local or state regulation or the manufacturer's recommendation.

- Fertilizers will be applied as recommended by the manufacturer and worked into the soil to limit exposure to stormwaters. Fertilizers will be stored in a covered area or in watertight containers.

- All paint containers will be tightly sealed and properly stored to prevent leaks or spills. Spray painting will not occur on windy days and drop cloths will be used to collect and dispose of drips and over spray.

- Surplus concrete or drum wash water will not be allowed to contact stormwater.

- All construction waste material will be collected, deposited, and stored in metal dumpsters.

Stormwater Management System

The stormwater management system would be designed in accordance with the EPA's guidance document entitled *Storm Water Management for Construction Activities – Developing Pollution Prevention Plans and Best Management Practices* (EPA 832-R-92-005, September 1992). The primary means of controlling site runoff would be by retention and percolation. As noted in Section 3.2.2.4, stormwater would be directed to the detention pond and then to the tile field, and wastewater and selected stormwater would be directed to a separate retention pond for percolation and evaporation.

Temporary and permanent structural devices to divert, store, or limit runoff from disturbed areas would be used on the project site. Details of the structural control measures would follow applicable requirements of *Volume II – Construction Stormwater Pollution Prevention* of *Storm Water Management in Washington State* or accepted industry standards. Such devices would include silt fences, sediment traps (catch basins), straw bale dikes, storm sewers, inlet protection, culvert inlet/outlet protection (rock or rip-rap), and stormwater retention basins as appropriate.

Temporary stormwater controls would be installed prior to breaking ground and permanent stormwater controls would be installed at the completion of rough grading. Early in the construction phase, a retention basin would be installed to receive runoff for the higher elevation (north) area and perimeter silt barriers (fences) would be installed on the lower elevation (south) boundaries of the site. The silt barriers would ensure runoff not captured by

the retention basin does not result in offsite discharges of silt. Temporary swales would be used to direct and slow runoff flows to the retention basin.

Fabric silt fences and temporary swales leading to the main retention basin would be the primary methods used to control erosion and runoff during construction. Temporary swales would be seeded with grass, lined with stone or concrete, or provided with another appropriate lining system. In addition, where required, weirs, straw bales, or washboards would be used to slow stormwater velocity and allow settling of suspended soil.

Surface ditches and swales would be used to direct runoff from disturbed areas into the retention basin until the underground storm sewer system is installed. Once the storm sewer system is installed, stormwater runoff from disturbed areas would be directed to permanent inlets and ditches, which would convey the water into the storm sewer system. Silt fence protection would be provided on some inlets to remove silts and help prevent erosion. Vegetation may be provided to further reduce pollutants.

Runoff from pavement or potentially oil-contaminated areas would be directed to an oil/water separator installed with the separate storm sewer system. The oil/water separator would be installed in its permanent location during construction to manage construction runoff. The storm sewer system would then convey the water to the wastewater retention basin for percolation. Drainage patterns and riprap would be designed to slow flow rates, dissipate water energy, and prevent erosion while directing runoff to the detention basin.

Stabilization of Disturbed Areas

Disturbance would be limited to only the area needed for project construction to help minimize the potential for stormwater runoff. Existing vegetation would be preserved where possible. Where appropriate, disturbed areas would be temporarily seeded or mulched to reduce erosion and runoff during construction. Disturbed areas would be returned to their preconstruction state as work is completed. During construction, any disturbed areas onsite are to be included under the NPDES Storm Water Pollution Prevention Plan.

Disturbed portions of the site would be stabilized within 7 days after construction activities have ceased, except when snow cover precludes construction or when construction would resume within 21 days. Stabilization practices may include temporary or permanent seeding, mulching, geotextiles, sodding, or aggregate surfacing. Because the project is generally located on the highest ground in the area, most runoff would be from stormwater falling directly on the disturbed area. Permanent stabilization would take place no later than 7 days after construction activities have permanently ceased in an area.

Permanent Stormwater Management

The overall permanent stormwater collection and management system includes roof drains and piping (for buildings), area drains (for tanks and outdoor equipment), and catch basins and curb inlets (for paved areas) draining into an underground stormwater conveyance system. Stormwater falling on the facility's major structures, such as the generation building and the air-cooled condensers, would be collected in gutters and directed into the stormwater

system. The runoff from paved surfaces and other outdoor areas of potential oil or chemical contamination would be routed through pollution control equipment, such as an oil/water separator, prior to discharge into the wastewater detention pond.

The switchyard on the northern part of the site would be graded flat and surfaced with crushed rock, allowing percolation of precipitation into the underlying soil. The equipment in the switchyard would be gas-insulated and would contain no spillable oil. The equipment in the switchyard would be supported on small concrete foundations surrounded by the crushed rock surface. Thus, there would be no significant impervious surfaces and no potential for oil contamination in this area. A retention basin is not planned for this area because postconstruction runoff rates are expected to be similar to the existing runoff rates in this area.

Project wastewater (approximately 51 gpm) and stormwater routed through oil/water separators would be routed to a detention pond and allowed to infiltrate into the soil. A portion of this water would be used for landscape irrigation. All other stormwater would be collected in a retention basin at the southeast corner of the plant site and released to the subsurface through an adjoining drain tile system. The proposed location for the stormwater retention basin and drain field is in the area of several small ravines and relatively steep topography that drains southward toward SR 261. The tile field, which is expected to cover a 2- to 3-acre area, would be engineered to accommodate the design discharge requirements and would provide a sand/gravel filtering material. To a limited extent, some of the water would also be released to the subsurface by seepage through the walls and floors of the retention basin.

The basin, as currently configured, would be designed to hold 4.1 acre-feet of water, plus 2 feet of freeboard, which should accommodate the 25-year/24-hour flood.

In addition to the stormwater collection system described above, all areas housing chemicals would be protected with concrete containment areas. All indoor areas with the potential for oil or lubricant spills would also be protected by concrete containment structures, with drains directed to an oil-water separator. Treated water from the oil-water separator would be discharged as wastewater and would not be directed to the stormwater collection system. Fuel oil storage onsite (other than that required for vehicles) is expected to be limited to the diesel fuel stored for the pump used for fire suppression (approximately 50 gallons). The diesel tank would be located adjacent to the pump within its own concrete containment to capture spills. The containment would be sized to impound the total volume of the tank plus freeboard to prevent splash. It would drain to a low collection point with a locked-closed manual valve controlling discharge. This drain would allow uncontaminated waste collected in the containment (washdown or precipitation) to be properly discharged manually while maintaining containment at all other times.

4.3.2.2 Construction

Surface Water and Runoff

Generation Plant

Earthwork required to construct the plant would include grubbing, excavating, filling, tile field installation, and final grading. The plant entrances and access roads would be surfaced with aggregate during construction; they would be paved with asphalt near project completion. During construction, it is also expected that onsite areas adjacent to the plant footprint would be used as temporary fabrication and laydown areas.

As with any construction project where excavation and fill is required for site preparation, it is likely that runoff would increase as a result of construction activities. Substantial regrading would result in removal of vegetation, recontouring of the landscape, and to some extent, compaction and a reduction in permeability of the near-surface soils. All of these factors would increase the potential for runoff. The areas with greatest potential for increased runoff would be along the southern boundary of the plant site where fill placement would result in steeper slopes and along the northern site boundary where excavation would result in steeper slopes.

As addressed in Section 4.3.2.1, SPC has committed to implementing construction best management practices (BMPs) and will follow the stormwater collection and management prescribed in their Storm Water Pollution Prevention Plan. These are expected to minimize erosion, sedimentation, and turbidity impacts due to earthwork and site traffic.

In addition, the high permeability of the soil and the presence of a ridge of high ground between the construction area and the Snake River would make it highly improbable for runoff from the construction site to be released directly into the Snake River.

During construction, areas where hazardous substances are stored and used would be provided with containment structures to minimize uncontrolled releases of spilled materials.

Consequently, no significant construction-related impacts to surface water or runoff are expected during plant construction.

Water Pipeline

Construction of the water pipeline would require excavation of a trench along the abandoned railroad right-of-way, and for a short distance across the Tucannon River floodplain between the railroad and the SR 261 bridge across the river. Although this alignment follows the river for much of its length, the pipeline trench would be elevated above surface water bodies. Intermittent streams that cross the pipeline alignment pass through culverts below where the pipeline trench would be excavated.

Although the water pipeline would not be constructed directly through or in contact with any surface water bodies, it would be directly upslope and relatively close to the Tucannon River

for much of its length. Consequently, construction activities associated with the pipeline installation could have an adverse impact on surface water quality. Specifically, improper placement or erosion of stockpiled soils during trenching could result in sedimentation in the stream or adjoining wetlands. If the excavated soils contain contaminants from past uses, any impact from sedimentation or leachate passing through these soils would be compounded by potential release of contaminants to surface water. Also, any spills or leaks of petroleum products from construction equipment could potentially migrate to surface water if they were not adequately contained.

Because pipeline construction would be limited primarily to an existing railroad right-of-way, which is already compacted and essentially flat, an increase in runoff from these areas would be unlikely. The segment of the alignment between the railroad right-of-way and the plant site would be somewhat steeper. In this area, a heavy rainfall during construction could result in channeling of runoff along the open pipeline trench, depending on the permeability of the underlying soils and the intensity of rainfall.

During construction of the water pipeline, BMPs would be implemented and the requirements of the SWPPP would be followed to minimize impacts. Appropriate setbacks, construction methods, and required mitigation methods (such as silt fences) would be implemented to minimize the potential effects of construction on the Tucannon River. Therefore, no significant impacts to surface water or runoff are expected during construction of the water pipeline.

Floodplains

Generation Plant

The plant site is not located within the 100- or 500-year floodplains of the Snake River. Construction of the plant would not affect floodplain functions or flood hazards of the Snake River.

Water Pipeline

A portion of the water pipeline would be located within the 100- and 500-year floodplains of the Tucannon River. The final SWPPP for the project would include construction of the water pipeline. Implementing BMPs as prescribed in the SWPPP would prevent an increase of runoff from the railroad right-of-way and minimize potential impacts to floodplain functions or flood hazards.

Culverts within the railroad ballast are not expected to be affected by construction of the water pipeline, and construction would not affect Tucannon River flow. Thus, construction would not impede flood flows.

In addition, the potential for a large-scale flood event is slight, considering the relatively short duration (a few months) that would be required to construct the pipeline and the infrequency of a 100-year flood.

In summary, water pipeline construction is not expected to be affected by, or have an effect on, the Tucannon River floodplain.

Groundwater

The greatest threats to groundwater would be from leaks and spills of fuels and lubricants that are stored onsite for use by construction equipment. Along the Tucannon River valley the soils are expected to be moderately permeable with a very shallow water table, whereas at the plant site the water table is deep but the soils are highly permeable. In either case, it could be difficult to prevent a large uncontrolled spill of contaminants from reaching the water table. Therefore, contamination control during construction would be necessary to protect groundwater. As described above, SPC has committed to design measures intended to provide contamination control.

To minimize uncontrolled releases of contaminants during construction, elevated fuel tanks would be located in areas designated for vehicle refueling. The fuel tanks would be located within an earthen berm with an oil-proof liner sized to contain the volume released by failure of the largest tank within the berm. The actual refueling area would be immediately adjacent to the berm and graded to simplify cleanup of small spills that occur during vehicle refueling.

If these measures and the recommended mitigation measures presented in Section 4.3.2.1 are implemented, construction activities are not expected to impact groundwater.

Public and Private Water Supplies

No environmental impacts to public or private water supplies would be expected to result from construction of the plant or the new well and pipeline. However, in the event of a large uncontrolled release of fuel at the plant site, there would be a potential for the contamination to reach one of the water supply wells at either end of the site.

4.3.2.3 Operation and Maintenance

Surface Water and Runoff

Generation Plant

Currently, site runoff is believed to be minimal, owing to the high permeability of surface soils, the relatively low relief of the site, and the low rainfall the area receives. The completed generation plant would result in an increase in runoff by reducing site vegetation, compacting soil, creating locally steeper slopes, and covering about 7 acres of the site with impervious surfaces.

There is also a potential that runoff could increase in the ravines in the southeastern corner of the plant site in response to the use of the retention basin and drain field. If subsurface soils are not sufficiently permeable to allow rapid downward infiltration of the drain field

discharge, or if there is substantial seepage through the retention basin floor and walls, this area could experience increased runoff, especially during heavy rainfall or snow melt.

Sanitary wastewater would be treated by an onsite facility before being routed to the tile field. Release of facility-associated water from the site directly into the Snake River is highly improbable due to the high permeability of the soil and the presence of a ridge of high ground between the site and the Snake River.

Consequently, no significant operation-related impacts to surface water or runoff are expected.

Water Pipeline

No appreciable change in runoff is expected to result from operation of the water pipeline. It would be situated on essentially flat-lying ground with the grade and vegetation along the alignment returned to approximately existing conditions. Thus, water pipeline operation would have no impacts on surface water or runoff.

Floodplains

Generation Plant

Being located 150 feet above the Snake River, the generation plan would not impede flood flows. In addition, runoff generated on the developed or disturbed site would be retained for discharge by percolation, with design controlled by the 25-year/24-hour storm event. Operation of the facility would result in no increase to runoff leaving the site.

Because the site is not within the 100- or 500-year floodplains, it would not affect floodplain functions or flood hazards. Therefore, facility operation should not be affected by, or have an effect on, the Snake River floodplain.

Water Pipeline

As described for construction impacts, a portion of the water pipeline would be located within the 100- and 500-year floodplains of the Tucannon River.

Attaching the pipeline to the SR 261 bridge would not affect the hydrologic conditions of the existing floodplain nor provide any impediment to flood flow. The water pipeline would not affect existing culverts within the railroad ballast. In addition, since the pipeline would cross floodplains underground and by using an existing bridge, it would not impede flood flow and the pipeline would be designed to withstand burial in saturated ground. If storm-related erosion did result in a break in the water pipeline, the operation of the facility would cease until the line could be repaired.

Therefore, water pipeline operation should not be affected by, or have an effect on, the Tucannon River floodplain.

Groundwater

The project includes a stormwater runoff control plan that includes oil/water separators for runoff that could come in contact with oil or other petroleum-based contaminants. Diesel fuel and ammonia (used in the selective catalytic converter of the combustion turbine) would be stored in tanks that would be provided with containment facilities in compliance with applicable regulations. Therefore, it is unlikely that a large volume of contaminants would be released to the environment.

If spills occur that are not contained and reach the ground surface, potential impacts to the groundwater underlying the site could result. A significant leak of diesel fuel or other liquid contaminant to the ground surface during operation of the facility could migrate to the deep groundwater underlying the site. Similarly, release of a contaminant to the subsurface through the wastewater discharge system could impact groundwater quality.

Public and Private Water Supplies

The Starbuck Power Project would require approximately 74,000 gallons of water per day (gpd). SPC has secured an option to purchase 100 gpm, or up to 144,000 gpd, of water from the town of Starbuck's existing water right. The water would be piped from a new well installed adjacent to the existing well for the town of Starbuck. The new well may require a change in point of withdrawal authorization by Ecology unless SPC can comply with the well provisions of Revised Code of Washington (RCW) 90.44.100.

The water obtained from the town of Starbuck (100 gpm) would amount to approximately 35% of the town's total water right of 270 gpm. Since the town is reportedly only using about 15% of the water right, this added usage would not appear to adversely impact this public water supply. Based on a pumping test at the time the well was installed, the well is capable of producing 370 gpm, which is well in excess of the water right and the combined requirements of both the town and the plant. However, SPC would install a new well near the existing well to supply water required for the proposed project.

Although the town of Starbuck has two municipal water supply water rights, one well has a specific area to be served and the other does not. Specifically, Ecology does not have a detailed map showing the service area for the town's newest and largest water right. Use of the town water for the project would require preparation of a water system plan, normally prepared by the Department of Health, including a map of the area served. According to Ecology (Neve pers. comm.), this "plan would need to show the power plant as a part of the service area or the power plant would need to be annexed into the town. If a water system plan is not done or the plant annexed, then a change in place of use may need to be added to the town's water rights."

4.3.3 Additional Potential Mitigation Measures

In addition to the measures proposed to control runoff and for contamination control, the following measures would further reduce potential impacts on water resources:

- Erosion control mats should be employed to protect freshly cut and filled slopes until permanent controls are in place. This additional protective measure would be particularly important if earthwork cannot be accomplished during the dry months.

- Environmental sampling along the railroad right-of-way should be conducted prior to construction to determine whether the soils that will be excavated are contaminated from use by the railroad. If contamination were detected, a soil handling and disposal plan would need to be developed prior to excavation. This plan should describe measures that would be employed to assure that contaminated soil would not migrate to surface water bodies. It should also describe testing methodologies and proper handling and disposal methods for the contaminated soil, as well as health and safety measures for construction workers.

- In order to mitigate the potential for an increase in runoff and erosion along the ravines adjoining the stormwater retention basin and drain field, it would be necessary to conduct hydrogeologic testing to evaluate soil permeabilities in this area. This information could then be used to design the drain field to have sufficient capacity to receive discharge without increasing runoff in the adjoining ravines.

- The potential for increased runoff and erosion in the ravine directly downslope from the retention basin could be greatly reduced by lining the basin with an impermeable membrane. The need for this flow barrier should be evaluated as part of the hydrogeologic evaluation of the soils in this area.

- The potential for impacts to the town of Starbuck's water supply should be further evaluated early in the planning process. The well (or wells) that would be used should be tested to confirm that they are capable of producing the sustained quantity of water that would be required to supply both the town and the power plant. At the same time, the town's current water usage should be confirmed (the amount reported seems unusually low), and projected growth for the town should be considered in evaluating the future availability of water under the existing water right.

- Consideration should be given to attempting to acquire a water right from one of the wells adjoining the plant site, if there are water rights associated with those wells, buying another source of groundwater to provide mitigation for installing a new well, or to transferring part of the town of Starbuck's water right to a new bedrock well drilled onsite. This alternative approach to obtaining water would eliminate potential impacts associated with construction of the new well and the pipeline, while reducing the potential for any impacts that could result from a substantial increase in pumping from the town's well.

- If the Starbuck water right is used, it may be necessary to obtain approval from Ecology for a change of location of use, since the existing water right is specifically for use in the

town of Starbuck. Alternatively, the town of Starbuck could address the water connection and use in its water system plan. The town of Starbuck also would have to be in compliance with the beneficial use requirements of State water law.

- A spill control and cleanup plan should be prepared to specify how potential spills and leaks would be mitigated.

- Periodic testing of stormwater should be conducted to confirm that contaminants are not being released to site soils from the stormwater retention basin.

4.4 Wetlands, Vegetation, and Agricultural Crops

This section presents information related to wetlands, vegetation, and agricultural crops within the plant site and along the 6-mile segment of abandoned railroad grade running from a point near the plant site south to the Starbuck town water well.

Wetland plant community types referred to in this section are based on the U.S. Fish and Wildlife Service wetland classification system (Cowardin et al. 1979) and include palustrine emergent (PEM), palustrine scrub-shrub (PSS), and palustrine forested (PFO). Wetlands are defined by the state and the U.S. Army Corps of Engineers (Corps) as follows:

> *"Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas" (WAC 173-22-080, 33 CFR 328.3, 40 CFR 230.3)*

4.4.1 Existing Conditions

4.4.1.1 Generation Plant Site

Wetlands

During a field reconnaissance, no wetlands were observed at the plant site. The U.S. Fish and Wildlife Service National Wetland Inventory (NWI) maps show no evidence of wetland environments within the plant site. Soils onsite are Stratford very stony silt loams that are nonhydric and do not contain hydric inclusions. No hydrophytic vegetation or indicators of wetland hydrology have been identified within the plant site. Although swales exist within the site topography, these drainages do not exhibit wetland conditions. The proposed alignment for the 200 feet of natural gas pipeline contains no wetlands.

Vegetation

The project site lies within the Pacific Northwest's shrub-steppe vegetation zone (Franklin and Dyrness 1988) and is generally characterized by dry, hot summers and cold, moist winters. The plant site is located within the bluebunch/bluegrass (*Agropyron*/*Poa*) association zone of Daubenmire (1970, reprinted 2000) that dominates much of the lower Snake River valley. These historic vegetation zones are a result of the dry climate that has produced an ecosystem of grasses and forbs with a sparse representation of woody vegetation. Woody vegetation is often restricted to lower draws and is mostly dominated by rabbitbrush (*Chrysothamnus* spp.).

The historic shrub-steppe grassland has been affected by land management. The site has been used for cattle grazing, which has likely contributed to the current condition of native

vegetation interspersed with invasive non-native weeds. Native stands of bunchgrass and bluegrass have intermittently been replaced by species such as cheatgrass (*Bromus tectorum*) and knapweed (*Centaurea* sp.). Yellow starthistle (*C. solstitialis*) and tumble mustard (*Sisymbrium altissimum*) are especially common. Cryptogamic crusts—a thin layer of lichens, algae, fungi, and mosses found in unvegetated areas between grasses and forbs—are more intact in areas dominated by native grasses. These crusts are less apparent on areas dominated by exotic species.

A species request letter was submitted to the U.S. Fish and Wildlife Service (USFWS) for the proposed project on October 30, 2000. The response letter, dated December 29, 2000, identified Ute ladies'-tresses (*Spiranthes diluvialis*) as a federally listed threatened and endangered species as potentially occurring in the area. Ute ladies'-tresses generally occurs in wetland and riparian areas of open shrub or grassland habitats, including springs, mesic to wet meadows, river meanders, and floodplains. The list also included Spalding's silen (*Silene spaldingii*), a federally listed proposed species, as potentially occurring in the area.

The Washington Department of Fish and Wildlife (WDFW) Priority Habitat and Species (PHS) program reports no evidence of sensitive habitat. However, a sensitive-plant survey has not been conducted on or near the planned locations of project facilities to date.

Agricultural Crops

The plant site is not used for agricultural cropland and has remained under range management practices.

4.4.1.2 Water Pipeline Route

Wetlands

A portion of the abandoned railroad grade is located within the floodplain of the Tucannon River where the main stream and its side channels meander through the floodplains. Within the floodplain, the alignment crosses riparian vegetation and palustrine shrub-scrub (PSS) wetland areas. Although wetlands are not present on the abandoned railroad bed, wetlands are present in the floodplains where the proposed alignment drops off the railroad grade, crosses the floodplain, and connects to SR 261. These wetland areas include some palustrine emergent (PEM) wetland vegetation and pasture grasses. Thin-leaf alder (*Alnus incana*) grows along the riversides and locust (*Robinia* sp.) is found scattered within the vicinity. Spirea (*Spiraea* sp.) and common cattail (*Typha latifolia*) dominate the wetland areas.

Vegetation

The surface of the abandoned railroad bed has been overgrown with common grasses and forbs along some portions of the line. Non-native weed species are also present. In the northern portion of the alignment the bed lies approximately 30 feet above the adjacent shrub-steppe rangeland. The adjacent shrub-steppe community vegetation also includes native species associated with the basaltic cliffs to the west.

In addition to wetland areas described above, as it crosses the floodplain of the Tucannon River the central portion of the proposed alignment is flanked by wetland areas, riparian shrubs and trees, and areas of pasture grasses. Further south, the grade lies within pasture grasses and, just north of town, it is bordered on the east by a young stand of black cottonwood (*Populus balsamifera* ssp. *trichocarpa*) for approximately 0.3 mile. Near the pump station, vegetation is primarily a herbaceous cover of grass and forbs.

As described in Section 4.4.1.1, the USFWS indicated that Ute ladies'-tresses, a listed threatened and endangered species, has a potential to occur in the area.

Agricultural Crops

The portion of the abandoned railroad grade located just north of and within the town limits of Starbuck may have agricultural crops, including gardens, disked fields, or pasture, growing adjacent to the railroad bed. These crops would likely be for private use, not for commercial production.

4.4.2 Environmental Impacts of the Proposed Project

4.4.2.1 Construction

Impacts during construction at the proposed facility and within the existing abandoned railroad bed would involve direct disturbance to vegetation through heavy equipment, vehicular traffic, and crew activities. The disturbances would include clearing of vegetation, digging, filling, grading, trenching, and compaction of vegetation and soils. Unless preventive measures are taken, exposure and compaction of soils could encourage colonization of weedy species adapted to disturbed sites.

Generation Plant Site

Wetlands

No wetlands occur within the plant site, and there would be no effects on wetland resources.

Vegetation

Construction of the plant facility would result in the permanent loss of approximately 40 acres of vegetation, including grazed rangeland, with native shrub-steppe grasses, and areas dominated by non-native invasive species. The impacts on vegetation include direct clearing and filling that would be required to level the site and construct the project facility.

Installation of the 20-inch-diameter gas pipeline would result in the temporary disturbance of native and weedy rangeland vegetation located within the pipeline alignment. The pipeline would be installed between the existing gas mainline and the generation plant, a distance of approximately 200 feet. An area would be designated for trenching and temporary

stockpiling of soil. General equipment transport and other crew activities would require additional areas.

Agricultural Crops

No loss of agricultural cropland would be sustained because of construction activities within the plant site since this area is not used for agricultural production.

Water Pipeline Route

Wetlands

Wetland and wetland buffer impacts associated with the water line would be avoided where the water pipeline is placed within the abandoned railroad bed. Impacts to wetland vegetation may occur at the Tucannon River crossing where the alignment would leave the abandoned railroad grade, cross over to SR 261, parallel the roadway and bridge, and then route back to the abandoned railroad bed. Reconnaissance surveys indicated wetland areas are present within the floodplain. Detailed wetland evaluations would be required to determine the extent to which wetlands occur within the proposed construction corridor.

In this area it is anticipated that wetland vegetation would be removed to accommodate the width of the construction corridor for pipe installation to and from the roadway. Trees would be avoided to the extent possible, although wetland shrubs and trees situated immediately adjacent to the corridor may require some trimming of branches.

In the Application for Site Certification, SPC would provide information on the pipeline alignment, wetlands along the route, and, if appropriate, evaluations of wetland impacts and mitigation measures.

Vegetation

Vegetation impacts would not be significant since the water pipeline would lie primarily within the existing abandoned railroad grade. Impacts attributed to the water line would be temporary and would involve removal of weedy vegetation atop portions of the railroad bed. Impacts to vegetation would occur at the Tucannon River crossing where the alignment would leave the abandoned railroad grade, cross over to SR 261, parallel the roadway and bridge, and then route back to the abandoned railroad bed. Vegetation would be removed to accommodate the width of the construction corridor for pipe installation to and from the roadway. The corridor would be placed to avoid trees to the extent possible, and trees and shrubs situated immediately adjacent to the corridor may require removal of some branches.

Agricultural Crops

Agricultural practices are not carried out on the surface of the abandoned railroad grade. Foundation materials used to support the tracks (since removed) are not conducive to cultivation. Adjacent agricultural crops would not be affected by installation activities

restricted to the railroad right-of-way, and there do not appear to be agricultural practices ongoing in those portions of the alignment that would leave the abandoned right-of-way. As discussed for wetlands, further information on the alignment and the potential effect on agriculture would be presented in the SPC Application for Site Certification.

4.4.2.2 Operation and Maintenance

Generation Plant Site

Wetlands

Because no wetlands occur within the plant site, there can be no operational impacts to wetland resources.

Vegetation

Areas of natural vegetation would be trimmed as required to avoid interference with the operation of the proposed facility. To allow for visual inspection, the natural gas pipeline corridor would be maintained as grassland. Woody vegetation would be removed by mechanical methods. If areas of natural vegetation were converted to landscaped areas, these converted areas would require some regular maintenance such as mowing, trimming, and watering.

Vegetation adapted to higher levels of water input could develop in the area of the small swale located north of the north perimeter road, as this area is proposed to drain runoff to the southeast for further percolation. Invasive non-native weedy species, including noxious weeds, may become established. However, this is not expected to result in a significant impact.

Agricultural Crops

The plant site is not used for the production of agricultural crops. Therefore, there would be no operational impacts to cropland.

Water Pipeline Route

Wetlands

Wetland and wetland buffer impacts associated with maintenance of the water line would be avoided where the water pipeline lies within the abandoned railroad bed. Although wetlands lie adjacent to the railroad grade, inspections and maintenance activities would be limited to the railway right-of-way using existing access roads such as Powers Road.

Wetland vegetation may be affected at the Tucannon River crossing during maintenance activities. To allow for visual inspection, the water pipeline corridor—to and from the

roadway—would be regularly maintained and kept clear of woody vegetation. Trees and shrubs immediately adjacent to the corridor may require periodic trimming of branches.

Vegetation

Operational impacts to vegetation would not be significant since the water pipeline would be placed mostly within the existing abandoned railroad bed. The railroad grade materials support little more than sparse grass and weedy species, and maintenance operations would have minimal effect on this vegetation.

Operational impacts to vegetation would occur at the Tucannon River crossing where the alignment would leave the abandoned railroad grade. To allow for visual inspection, the water pipeline corridor would be regularly maintained and kept clear of woody vegetation. Trees and shrubs immediately adjacent to the corridor may require periodic trimming of branches. For nonwetland vegetation, there would be no significant impacts.

Agricultural Crops

Operational impacts associated with the proposed water line would be avoided where the water pipeline lies within the abandoned railroad bed. Operation and maintenance activities would be restricted to the railroad right-of-way and adjacent agricultural crops would not be affected. Existing roads would provide access to the railroad bed.

4.4.3 Potential Mitigation Measures

4.4.3.1 Generation Plant

Wetlands

There are no wetlands identified within the plant site. Therefore, there are no construction impacts requiring wetland mitigation.

Vegetation

Several mitigation measures are recommended:

- Areas not targeted for cut-and-fill or grading operations should be seeded for control of sediment runoff and wind erosion.
- Portions of the plant site not paved or covered with buildings or aggregate should be hydroseeded after construction to prevent erosion runoff.
- Plantings within the facility should consist of native vegetation compatible with or similar to naturally occurring species in the adjacent shrub-steppe areas.

- To minimize the establishment of noxious weeds, construction crews should limit transport of seeds to agricultural or rangelands from roadside areas by cleaning equipment and vehicles before entering construction areas.
- Weed-free straw bales should be used where appropriate for erosion control.
- SPC should prepare and implement a landscape plan that includes long-term weed control measures.

Agricultural Crops

The plant site is not used for the production of agricultural crops. Therefore, there are no construction impacts requiring mitigation for the loss of cropland.

4.4.3.2 Water Pipeline

Wetlands

Where wetlands are present at the Tucannon River crossing, wetland mitigation should include the following:

- Document preconstruction hydrology by identifying the water source (e.g., stream flows of the Tucannon River, rainfall, surface water runoff) and whether the wetland is seasonally or perennially flooded or saturated.
- Limit construction corridor to minimum width practical in wetlands and riparian areas.
- Use silt fencing around wetlands and buffers in the construction corridor to prevent the movement of sediment to the resources.
- Install impermeable material at the edge of the wetland where appropriate, and in the pipeline trench, preventing wetland drainage.
- Remove, salvage, and replace the upper 12 inches of topsoil.
- Stockpile excavated material in upland areas.
- Use construction mats in saturated wetland areas to minimize soil rutting and plant disturbance.
- Perform final grading of the affected wetland area to preproject contours.
- Maintain the flow of existing drainage patterns.
- Reseed or hydroseed disturbed emergent wetland areas with a native grass mix.

- Provide additional compensation if the federal permitting authority (the Corps) requires such action through the Section 404 Clean Water Act permit process.

If wetland buffer impacts should occur, these impacts should be compensated by reseeding with local native grass species.

Unavoidable impacts to wetlands should be compensated by creating and enhancing other wetland areas if federal and state wetland permitting agencies determine additional compensation is required.

Vegetation

At the Tucannon River crossing, vegetation within the pipeline corridor should be reseeded with native grass species common to the area, or an acceptable non-native grass mix. If trees adjacent to the pipeline corridor require trimming, branches should be left on the ground in naturally occurring vegetation as habitat features. However, cut debris should not be placed in any stream areas where it could obstruct natural flows, including flow through culverts.

Agricultural Crops

There are no agricultural impacts associated with the installation of the water pipeline. Therefore, no construction impacts would create a need for mitigation of lost cropland.

4.5 Wildlife

This section describes the existing conditions, potential impacts of proposed construction and operation, and mitigation measures for potential impacts to wildlife species that are found within the vicinity of the proposed project.

4.5.1 Existing Conditions

4.5.1.1 Generation Plant Site

General Wildlife Species

The Washington Department of Fish and Wildlife (WDFW) Priority Habitat and Species database (WDFW 2000) indicates that several priority wildlife species or habitats are known to occur in the vicinity of the plant site. Priority species known to occur in the project vicinity consist of the ferruginous hawk, prairie falcon, osprey, night snake, mule deer, waterfowl, and upland game birds, including ring-neck pheasant, chukar, Hungarian partridge, and quail. The proposed plant site is in an area identified as mule deer winter range. Other priority habitats near or adjacent to the proposed plant site include riparian and cliff habitats.

Known occurrences of priority species include an osprey nest that has been documented on the Lyons Ferry Bridge, approximately 1.2 miles northwest of the property (CH2M Hill 1994), and nesting prairie falcons, night snakes, chukar, and mountain quail, which are known to occur within approximately 2.0 miles of the project area (WDFW 2000).

Direct wildlife observations at the plant site by SPC's consultant, CH2M Hill (1994), and by EFSEC's independent consultant, Jones & Stokes (during field visits in fall 2000), were limited to a few bird species and evidence of both large and small mammals. Bird observations included mourning doves, western meadow larks, European starlings, rough-winged swallows, ring-billed gulls, American kestrels, and red-tailed hawks. Evidence such as tracks, scat, and excavations, indicated the presence of horses, cattle, coyotes, pocket gophers, ground squirrels, and badgers. Whitetail jackrabbits also may occur in the project vicinity. Although bighorn sheep and elk may be present in the Tucannon River subbasin, these species are not expected to occur in the downstream portion of the basin in the vicinity of the proposed water pipeline route.

Threatened and Endangered Species

A species request letter was submitted to the USFWS for this project on October 30, 2000. The response letter, dated December 29, 2000, identified no federally listed threatened or endangered wildlife species as potentially occurring in the area. The list did include the Washington ground squirrel (*Spermophilus washingtoni*), a federally listed candidate species, as potentially occurring.

Evidence of ground squirrel activity was documented within the SPC property and vicinity in the CH2M Hill study and observed during field reconnaissance surveys conducted in November 2000 by Jones & Stokes. The closest area known to be inhabited by Washington ground squirrel is between 4 and 5 miles southeast of the project site (WDFW 2000).

The ferruginous hawk is a state-listed threatened species and is known to occur in the area. Records indicate ferruginous hawk nests between 0.5 mile and 2.0 miles southwest of the project site (CH2M Hill 1994). These nests are located in the cliff bluffs.

4.5.1.2 Water Pipeline Route

General Wildlife Species

As stated earlier, the WDFW Priority Habitat and Species database (WDFW 2000) indicates that several priority wildlife species or habitats are known to occur in the vicinity of the plant site, and the water pipeline route passes through known pheasant and mule deer habitat. Additionally, the route passes within approximately 100 feet of a known nest site for prairie falcon (WDFW 2000).

The vegetation within and adjacent to the abandoned railroad right-of-way supports a variety of songbirds and small mammals. The habitat provides cover and forage for both bird and mammal species, including pheasant, mule deer, and ferruginous hawk.

Threatened and Endangered Species

No federally listed threatened or endangered wildlife species are expected to occur within the proposed water pipeline route. The Washington ground squirrel, a candidate species, was identified as potentially occurring and may inhabit areas that are primarily herbaceous grass and forb cover along the water pipeline route. The ferruginous hawk, a state-listed threatened species, is known to nest within approximately 100 feet of the proposed water pipeline route (WDFW 2000).

4.5.2 Environmental Impacts of Proposed Project

4.5.2.1 Construction

Impacts during construction would involve direct and indirect disturbance to species through habitat removal and noise disturbance caused by the use of heavy equipment and vehicles, and crew activity. These disturbances would include digging, filling, grading, trenching, vegetation clearing, and compaction of vegetation and soils.

Generation Plant

General Wildlife Species

Approximately 40 acres of vegetation, including native shrub-steppe habitat, rangeland, and non-native invasive species, would be permanently removed through clearing and cut and fill activities. Within this area of disturbance, wildlife species—predominately birds and small mammals—would be displaced, and the value of the remaining habitat for general wildlife species would be decreased. Noise and construction activity also would potentially disturb wildlife species using habitat adjacent to the proposed plant site.

Temporary disturbance to and displacement of wildlife species would result during the installation of the gas pipeline. Impacts would include temporary displacement from the construction corridor and adjacent areas due to both construction activity and temporary habitat alteration. Noise and activity associated with construction would also potentially disturb wildlife species using adjacent habitat.

Although construction activities may result in the loss of individuals of species currently using the plant site and adjacent areas, it is not expected that priority species would be affected because no priority species have been documented on the construction sites. As a result, the impact of construction on general wildlife is not expected to be significant. Construction of the proposed plant would result in a loss of approximately 40 acres of mule deer winter range, which represents a relatively small portion of the habitat available in the vicinity.

Plant construction is not expected to disturb nesting activities of osprey and prairie falcon since the nests are distant. Plant construction would permanently convert approximately 40 acres of potential prairie falcon foraging habitat to a developed condition. Osprey foraging would not be impacted.

Plant construction would cause temporary disturbance to nesting and foraging activities of upland game birds in adjacent habitats. Plant construction would permanently displace upland game birds from the site and remove foraging and nesting habitat within the 40-acre plant site.

Mule deer would be temporarily displaced from the area by plant construction. Approximately 40 acres of winter range would be converted to a developed condition.

Other species potentially occurring on the site, such as coyote, ground squirrel, songbirds, and raptors, would also be displaced by construction activities. Plant construction would permanently convert potential habitat for these species to a developed condition.

As a result of the relatively small area of development and the large area of undeveloped land in the vicinity, no significant impacts on these species are expected.

Threatened and Endangered Species

As state previously, no federally listed threatened or endangered wildlife species or habitats are known to occur in the vicinity of the plant site. The Washington ground squirrel, a federal candidate species, may inhabit the project area. Project implementation would result in the conversion of potentially suitable habitat for the Washington ground squirrel to a developed condition. Construction activity could also result in mortality of individuals inhabiting the site. Ground squirrels inhabiting the site must be identified to the species level before the significance of impacts can be determined.

The ferruginous hawk is a state-listed threatened species. A known ferruginous hawk nest is located within 0.5 mile of the plant site. Temporary disturbance to the nest site is possible during project construction; however, due to topographic features between the nest site and plant site, disturbance is not expected to occur. Permanent conversion of 40 acres of potential foraging habitat to a developed condition would decrease available foraging habitat for ferruginous hawks in the area.

Water Pipeline

General Wildlife Species

General wildlife habitat impacts along the water pipeline route would be primarily associated with wetland habitat because there is little vegetation within the abandoned railroad right-of-way. Species directly associated with wetland vegetation may be impacted at the Tucannon River crossing. These species would include some songbirds but primarily small mammals and potentially amphibian species. Because the removal of trees would likely be avoided and trimming would occur only along the corridor, perching habitat for species such as raptors would not be directly impacted.

A prairie falcon nest is known to occur adjacent to the abandoned railroad bed. Project construction during the nesting season for this species has the potential to disturb nesting activities.

Construction of the water pipeline is not expected to disturb nesting osprey given the distance from the alignment to the known nest site. Construction would cause temporary displacement of upland game birds from the area; however, vegetation would regenerate along the alignment, once again providing habitat for these species, and no permanent habitat loss would occur. Construction during the nesting season for these species could disturb nesting activity or result in the destruction of nests and eggs.

Foraging habitat for mule deer within the pipeline construction corridor would be temporarily altered as a result of vegetation removal. However, there is sparse vegetation along the corridor and vegetation would be allowed to regenerate after construction.

Other species potentially occurring along the alignment, such as coyote, ground squirrel, songbirds, and raptors, would also be displaced by construction activities. Pipeline

construction would temporarily convert potential habitat for these species to a disturbed condition.

Due to the disturbed nature of much of the proposed alignment (abandoned railroad bed), the short construction period, and the planned revegetation, construction of the water pipeline would not have a significant impact on general wildlife species.

Threatened and Endangered Species

No federally listed threatened or endangered wildlife species or habitats are known to occur in the vicinity of the proposed alignment. The potential exists for the Washington ground squirrel to inhabit areas along the water pipeline route with primarily herbaceous cover of grass and forbs. Temporary disturbance would occur as a result of construction activities, with the potential for mortality of individuals utilizing the construction corridor. Ground squirrels using the site must be identified to the species level before the significance of impacts can be determined.

The ferruginous hawk is a state-listed threatened species known to occur in the area. A ferruginous hawk nest is known to occur adjacent to the abandoned railroad bed. Project construction during the nesting season for this species has the potential to disturb nesting activities.

4.5.2.2 Operation and Maintenance

Generation Plant Site

Operation of the plant, including emissions, is not expected to significantly affect wildlife.

Periodic trimming and other mechanical methods to maintain grassland along the natural gas pipeline and around the facility would temporarily disturb wildlife species that return to inhabit the site after construction. Maintenance may encourage invasive plants to become established, and wildlife that can utilize such habitats would become more common. Operation and maintenance are not expected to result in a significant impact on wildlife.

The presence of four 150-foot-tall stacks and the increase in night lighting may affect bird and bat flight patterns. There have been several documented occurrences of bird mortality caused by collisions with manmade structures, including stacks and towers (Kerlinger 2000a). Structure height and lighting appear to be important factors affecting the number of bird collisions (Kerlinger 2000b) as does tower location in relation to areas of high bird use and migration routes (Manville 2000). Based on information in these studies, the 150-foot stacks are not expected to have a large impact on avian mortality, although some mortality is possible. The significance of this effect and the potential for bird or bat collisions with the stacks remain to be addressed by SPC in its Application for Site Certification.

Water Pipeline

Maintenance activities associated with operation of the water line would be limited to the pipeline easement. Much of the pipeline corridor is currently gravel railroad ballast that does not support vegetation. Where the right-of-way departs from the abandoned railroad bed, the pipeline corridor would be maintained as herbaceous cover, thus encouraging wildlife species associated with that habitat. There is the potential for invasive species such as noxious weeds to occur on the site, however, which would decrease the value of the wildlife habitat.

If maintenance activities are carried out during the nesting season for ferruginous hawks, prairie falcons, or upland game birds, disturbance to nesting may occur. Maintenance activities during the nesting season for upland game birds may also cause direct loss of nests or eggs within the maintained right-of-way.

Maintenance activities would also cause temporary displacement of other species, such as mule deer and songbirds, from the site. If maintenance actives include mowing, some mortality of small mammals may occur.

Although operation and maintenance of the water pipeline is generally not expected to result in a significant impact on wildlife, SPC will need to provide information in their Application for Site Certification regarding the presence or absence of threatened/endangered species before a final determination of significance can be made.

4.5.3 Potential Mitigation Measures

Several mitigation measures have been identified and are recommended for inclusion in the project:

- Preconstruction surveys should be conducted for wildlife nest locations, burrows, and dens. Species and locations found should be documented.
- Avoid installing the water line in sensitive habitat where the pipeline leaves the abandoned railroad right-of-way to ensure habitats with greater value for wildlife are avoided. Tree removal should also be avoided where possible.
- Construction should be timed to avoid impacts to breeding birds, especially raptors.
- After construction is complete, disturbed areas not used for the project should be restored to allowed continued use by wildlife.

4.6 Fisheries

4.6.1 Existing Conditions

4.6.1.1 Generation Plant Site

The project site is bounded by SR 261 to the southwest and the Snake River to the northeast (Figure 3-1). The Snake River flows northwest in the vicinity of the project site and joins the Columbia River approximately 50 miles downstream. The project site is located within the lower Snake-Tucannon watershed.

The project site is located on a bluff above and to the southwest of the Snake River (in the vicinity of the project site the Snake River is also known as Lake Herbert G. West, a reservoir created by Lower Monumental Dam). The property boundary nearest the river is approximately 350 feet horizontal distance from the river. The vertical drop from the site to the normal river water level is 150 feet (Black & Veatch 2000). The site is used for grazing, and vegetation consists primarily of grasses. The site slopes away from the Snake River (i.e., the highest elevations are located near the bank of the Snake River) and the site itself does not support fisheries. The confluence of the Snake and Tucannon Rivers is located approximately 1.5 miles to the southeast (upstream) of the project site.

The Snake River (Lake Herbert G. West) is the only body of water in the vicinity of the site of the proposed plant. Chinook salmon, sockeye salmon, steelhead, native char (bull trout and Dolly Varden), Pacific lamprey, river lamprey, Umatilla dace, leopard dace, and margined sculpin are known or expected to occur in the lower Snake River (Table 4.6-1). Migrating salmonids must negotiate numerous dams on both their upstream and downstream migrations. A state hatchery (the Lyons Ferry hatchery) is approximately 1.5 miles downstream of the project site on the Snake River. This facility produces summer steelhead, spring chinook salmon, fall chinook salmon, and coho salmon. In addition, the Tucannon River hatchery produces summer steelhead and spring chinook; it is located more than 30 miles upstream on the Tucannon River.

The lower Snake River provides poor conditions for salmonids. High sediment deposition has resulted from reservoirs of slow-moving water, such as Lake Herbert G. West, the impoundment behind Lower Monumental Dam. In creating the lake, substantial riparian areas and salmonid habitat were inundated along the Snake River as the reservoir was filled. High sediment deposition entombs salmonid eggs and low dissolved oxygen levels reduce survival of incubating eggs and rearing juveniles. The reservoirs also support numerous introduced fishes that compete with or prey upon juvenile salmonids. Thus, the lower Snake River provides negligible habitat for salmonids and is used primarily as a migration corridor.

Table 4.6-1. Special-Status Fish Species Likely to Be Present within the Project Area

Species	Status*	Key Habitats of Concern	Key Habitat Present within Project Area
Chinook, fall-, spring-, summer-run (*Oncorhynchus tshawytscha*)	FT, SC	Rivers/streams where present, associated riparian areas and contributing waters	Known to occur in the lower Snake-Tucannon watershed
Sockeye salmon (*Oncorhynchus nerka*)	FE, SC	Rivers/streams where present, associated riparian areas and contributing waters	Known to occur in the lower Snake-Tucannon watershed
Steelhead, summer-run (*Oncorhynchus mykiss*)	FT, SC	Rivers/streams where present, associated riparian areas and contributing waters	Known to occur in the lower Snake-Tucannon watershed
Bull trout (*Salvelinus confluentus*)	FT, SC	Rivers/streams where present, associated riparian areas and contributing waters	Known to occur in the lower Snake-Tucannon watershed
Pacific lamprey (*Lampetra tridentate*)	FSC	Rivers/streams where present, associated riparian areas and contributing waters	Known to occur in the lower Snake-Tucannon watershed
River lamprey (*Lampetra ayresi*)	FSC, SC	Rivers/streams where present, associated riparian areas and contributing waters	Known to occur in the lower Snake-Tucannon watershed
Umatilla dace (*Rhinoichthys falcatus*)	FSC, SC	Undammed riverine habitat with cobble or stone bottom and relatively warm, productive waters	Key habitat may remain within the Tucannon watershed
Leopard dace (*Rhinoichthys falcatus*)	FSC, SC	Slow moving streams of the Upper Columbia	May occur in the lower Snake-Tucannon watershed
Margined sculpin (*Cottus marginatus*)	FSC, SC	Rivers with moderate to rapid currents over a bed of rubble or gravel	Known to occur in the Tucannon River

* Status definitions:

FE – Federal Endangered
FT – Federal Threatened
FSC – Federal Species of Concern
SC – State Candidate
SS – State Sensitive

4.6.1.2 Water Pipeline Route

The water pipeline would also be located within the lower Snake-Tucannon watershed. The water pipeline would run from the town of Starbuck to the generation plant, installed primarily within an abandoned railroad right-of-way which is west of and generally parallel to SR 261. The route is also parallel to the Tucannon River and Snake River (Figure 3-6). The abandoned bed is generally located away from the rivers and potential fisheries. However, the water pipeline would cross the Tucannon River, a tributary to the Snake River, via attachment to the SR 261 bridge.

The Snake River and Tucannon River are the only bodies of water in the area of the water pipeline. The river condition and the fish species present in the Tucannon River are the same as those described above for the Snake River.

In addition, high sediment deposition has contributed to low dissolved oxygen in the lower reaches of the Tucannon River (USDA 1984). Loss of riparian vegetation along the lower Tucannon River has reduced stream shading, and water temperatures are too warm during the summer to provide rearing areas for juvenile salmonids (USDA 1984).

4.6.2 Environmental Impacts of the Proposed Project

4.6.2.1 Construction

Generation Plant

The high permeability of the soil and the presence of a ridge of high ground between the construction area and the Snake River would make it highly improbable for runoff from the construction site to be released directly into the Snake River. In addition, the plant site, being located on a bluff above and away from the Snake River, does not support any fisheries, and therefore, construction activities would not have any direct effects on fisheries. Consequently, no significant impacts to fisheries are expected during construction of the generation plant.

Water Pipeline

The only fishery resources potentially affected by pipeline construction would be associated with the Tucannon River crossing; the railroad right-of-way does not support fisheries. The water pipeline would cross the Tucannon River by attachment to the SR 261 bridge. When the pipeline is attached to the bridge, appropriate setbacks and construction methods would be required to minimize the potential effects of construction on the river and riparian vegetation, and therefore, fish and habitat. Consequently, no significant construction-related impacts to fisheries are expected during water pipeline construction.

4.6.2.2 Operation and Maintenance

Generation Plant

Release of facility-associated water from the site directly into the Snake River is highly improbable due to the high permeability of the soil, the presence of a ridge of high ground between the site and the Snake River, and the proposed water collection system to be installed on the site. In addition, the plant site, being located on a bluff above and away from the Snake River, does not support any fisheries, and therefore, facility operation should not have any direct effects on fisheries resources. Consequently, no significant fisheries impacts related to operation of the generation plant are expected.

The potential effect of the project's groundwater consumption on flows and fisheries in the Snake River has not been investigated in this EA.

Water Pipeline

Operation of the water pipeline would have no effect on fisheries because the pipeline would be located primarily within an existing disturbed right-of-way and the right-of-way would be restored to preproject conditions once the pipeline is installed. Similarly, the alignment between the abandoned right-of-way and SR 261 would be restored to approximately preproject conditions, and there would be no effect on fisheries resources expected. Consequently, water pipeline operation would not impact fisheries.

4.6.3 Potential Mitigation Measures

The recommended mitigation measures discussed in Section 4.3 for water resources would also aid in minimizing or eliminating impacts on fisheries.

4.7 Energy and Natural Resources

The Starbuck Power Project would consume energy and natural resources directly and indirectly during both construction and operation. Direct consumption involves the use of natural gas as fuel for generating electricity during project operation. Indirect consumption refers to energy expended by vehicles and equipment in the construction, maintenance, and daily operation of the facility.

4.7.1 Existing Conditions

4.7.1.1 Energy Sources

Energy sources in the Starbuck area and in Columbia County include electricity provided by Columbia Rural Electric Association (REA) from the existing line that traverses the plant site from north to south. There is also an existing 500-kV BPA line traversing the plant site from east to west.

Pacific Gas and Electric (PG&E) operates the existing 36-inch Gas Transmission Northwest (GT-NW) pipeline that runs within 200 feet of the project site.

The PG&E GT-NW system interconnects with Alberta Natural Gas at Kingsgate, British Columbia; with Williams (Northwest Pipeline Corporation) at Spokane and Palouse, Washington, and Stanfield, Oregon; and with Pacific Gas and Electric Company and Tuscarora Gas Transmission Company at Malin, Oregon. Multiple taps also connect PG&E GT-NW to Washington Water Power, WP Natural Gas, and Cascade Natural Gas. Through this network of interconnections, the PG&E pipeline transports natural gas into and through Washington State (PG&E 2000).

Diesel fuel, gasoline, and other petroleum products are available in Columbia County at various service stations.

4.7.1.2 Nonrenewable Resources

Nonrenewable resources include gravel and other fill materials that are used to maintain existing roads and rights-of-way. Petroleum products are used for trucking, farming, commuting, and boating in the area.

4.7.1.3 Conservation and Renewable Resources

Conservation of water and electricity may take place on an individual basis in Starbuck and other communities in the general area through such methods as the use of insulation, energy-efficient lighting, and low-flow water fixtures.

4.7.2 Environmental Impacts of the Proposed Project

4.7.2.1 Construction

Energy Sources and Consumption

The Starbuck Power Project would be constructed using steel, glass, concrete, and other materials that require energy for fabrication and transport. Cranes, trucks, earthmoving equipment, tools, and other equipment operated during construction would consume additional energy. Data for anticipated energy use during construction are unavailable; however, consumption levels would likely not be considered significant over the 2-year construction period. Energy would predominately be consumed in the form of electricity, gasoline, diesel fuel, and oil. Electricity for construction would be supplied by the REA.

Electricity use during nonworking hours would primarily consist of lighting for security purposes. If electricity is not available (such as during power outages), power could be made available through the use of self-contained construction equipment such as engine-driven welders and portable gas/diesel electric generators.

Diesel, gasoline, oil, and electricity would be used for transporting construction materials and the workforce to the site; for operating and maintaining construction equipment; for installing the natural gas pipeline lateral, water lines, and onsite septic system; and for construction of the generation plant and support buildings. The amounts of energy that would be used are anticipated to be typical for a construction project of this size.

Other Nonrenewable Resources

Bulk construction materials such as soil, aggregate gravel, and sand would be supplied from quarries. Other building materials, construction equipment, and diesel fuel for the emergency generator used to provide power for fire-fighting pumps would likely be purchased from equipment material suppliers and service stations. The project is not anticipated to have a significant impact on the available energy resources in Columbia County.

Conservation and Renewable Resources

Best management practices would be used to minimize waste and spillage of fuels and oil during construction. The onsite fuel storage would reduce the need for trips offsite and therefore conserve fuels.

4.7.2.2 Operation and Maintenance

Energy Sources and Consumption

Natural Gas

The Starbuck Power Project would be a natural gas-fired, combined-cycle, combustion turbine facility whose purpose is to generate electricity. In this type of electrical generation process, natural gas is burned to fuel a gas turbine engine that drives a generator to produce electrical energy. Hot exhaust produced by the combustion turbine is used to boil water in a heat recovery steam generator (HRSG). Steam produced by the HRSG turns a turbine generator and produces additional electrical energy. Exhaust steam exiting each steam turbine is directed into an air-cooled condenser, where it is cooled until it condenses back into water (condensate). This condensate drains into a collection tank and is then pumped from the tank back to the two HRSGs, where it is again used to generate steam.

The project would consume approximately 100,000 cubic feet of gas per day. The PG&E GT-NW can deliver approximately 1 billion cubic feet of natural gas to the Pacific Northwest and can provide the natural gas to supply this project. PG&E GT-NW indicates that their primary source of natural gas is Canada, and that they also accept U.S. domestic gas supplies (PG&E 2000).

Although the existing gas supply appears to be sufficient to fuel the proposed project, it is not clear what the cumulative impact of other proposed and possible projects would be on the supply. However, as reported in the *Seattle Times* (January 31, 2001), "[a]t least a half-dozen gas-fired turbines are now in the proposal or permitting stage in Washington. If all of them are built, statewide, natural-gas consumption is projected to increase 147 percent by 2010, according to the state Office of Trade and Economic Development. It's not clear how that volume of natural gas could come to the state because both major gas pipelines serving Washington are already running near capacity." BPA intends to conduct a cumulative impact assessment regarding natural gas supplies and consumption and would address this issue in the SEPA/NEPA EIS to be prepared for this project.

Electricity

The Starbuck Power Project would obtain electricity from the Columbia REA. The REA receives its power from the BPA grid, connected at the Dayton Substation. Power demands are not expected to be high and would not have a significant impact on the REA.

Electricity generated from the project would be sold on a merchant basis (that is, electricity from the project could be sold to any customer). Electricity generated by the project would be transmitted to the power grid directly through two existing overhead 500-kV power lines owned by BPA and through a new BPA 15-mile-long transmission line extending from the site to the Lower Monumental Dam switchyard. As a result, electrical energy from the project would be available to customers on the BPA power grid and future customers who connect to the grid.

The project would provide additional electrical energy to the western United States.

Other Nonrenewable Resources

Minor amounts of fossil fuels, used for trucks and construction equipment, would be used for maintenance of the plant and water pipeline. The generator for the firewater pump would have a 50-gallon diesel storage tank.

Conservation and Renewable Resources

Water

The project would use air-cooled condensers. Based on information provided by SPC, water-cooled evaporative condensers for a plant this size would consume as much as 6.3 million gallons per day (gpd). The use of air-cooled condensers would result in water requirements of up to an estimated 74,000 gpd.

SPC has secured an option to purchase 100 gallons per minute, or up to 144,000 gpd, of water from the town of Starbuck's existing water right. As noted in Section 4.3, it is not clear whether or not this rate of withdrawal would have a negative effect on the town's water supply.

Energy Efficiency

Because combined-cycle combustion turbines are proposed for the project, energy would be produced in a manner that is more efficient than many other forms of production. Combined-cycle technology is currently considered the most advanced power generation technology available for natural-gas fired plants and is used or proposed for use by most power generation facilities using natural gas. Other forms of power production, such as wind and solar, are more efficient.

4.7.3 Potential Mitigation Measures

An overall plant energy conservation plan should be prepared and implemented to minimize the plant's consumption of electricity, water, and natural gas.

4.8 Noise

4.8.1 Introduction

Sound travels through the air as waves of minute air pressure fluctuations caused by some type of vibration. Because energy contained in a sound wave is spread over an increasing area as it travels away from the source, loudness decreases with distance.

Sound is measured in decibels. Because the human ear does not respond equally to all sound frequencies, an "A-weighted" scale (the dBA scale) is generally used to assess the effects of noise on people. A-weighted sound level measurements reduce the measured sound pressure level for low-frequency sounds while slightly increasing the measured pressure level for some high-frequency sounds. All sound levels in this section are provided in dBA.

People generally perceive a 10-dBA increase in a noise source as a doubling of loudness. For example, a 70-dBA sound level will be perceived by an average person as twice as loud as a 60-dBA sound. People cannot generally detect differences of 1 dBA between noise sources; a difference of 3 dBA is usually the smallest perceptible change in sound level. Table 4.8-1 shows some common noise sources and the sound levels they produce.

The dBA scale is logarithmic. Therefore, individual dBA values for different sources cannot be added directly to give the sound level for a combined source. For example, two sources, each producing 50 dBA, will, when added logarithmically, produce a combined noise level of 53 dBA. Federal regulatory agencies often use the "equivalent sound level" (known as the L_{eq}) to evaluate noise impacts. The L_{eq}, which is roughly equivalent to the average sound level, is the level of a constant sound with the same sound energy as the actual fluctuating sound.

Another way to evaluate noise impacts is by using percentage exceeded values such as L_1, L_{10}, and L_{50}. L_1 is the sound level that is exceeded 1% of the time (the 99th percentile) for the period under consideration. L_{10} is the sound level that is exceeded 10% of the time (the 90th percentile) for the period under consideration, and L_{50} for the 50th percentile, or 50% of the time exceeded.

For a given noise source, factors affecting the noise impact at a receiver include the distance from the noise source, the frequency of the sound, the acoustical absorbency of the intervening terrain, the presence or absence of obstructions, and the duration of the noise event. The degree of impact also depends on who is listening, existing sound levels, and when the noise event takes place.

Table 4.8-1. Weighted Sound Levels and Human Response

Sound Source	dBA*	Response Criteria
Carrier deck jet operation	140	Limit amplified speech
Limit of amplified speech	130	Painfully loud
Jet takeoff (200 feet) Auto horn (3 feet)	120	Threshold of feeling and pain
Riveting machine Jet takeoff (2,000 feet)	110	
Shout (0.5-foot) New York subway station	100	Very annoying
Heavy truck (50 feet) Pneumatic drill (50 feet)	90	Hearing damage (8-hour exposure)
Passenger train (100 feet) Helicopter (in-flight, 500 feet) Freight train (50 feet)	80	Annoying
Freeway traffic (50 feet)	70	Intrusive
Air conditioning unit (20 feet) Light auto traffic (50 feet)	60	
Normal speech (15 feet)	50	Quiet
Living room Bedroom Library	40	
Soft whisper (15 feet)	30	Very quiet
Broadcasting studio	20	
	10	Just audible
	0	Threshold of hearing

* Typical A-weighted sound levels taken with a sound-level meter and expressed as decibels on the scale. The "A" scale approximates the frequency response of the human ear.

Source: U.S. Council on Environmental Quality 1970.

When distance is the only factor considered, sound levels from isolated point sources typically decrease by about 6 dB for every doubling of distance from the noise source, beginning at a point from the source approximately three times the largest dimension of that source. For example, if the largest dimension of the noise source is 120 feet and it produces a sound level of 60 dB, then beginning from a point approximately 360 feet from the source, the sound level would attenuate at a rate of 6 dB per doubling of distance. At a distance of 720 feet from the source, the noise level would be 54 dB, and at 1,440 feet the noise source would be 48 dB.

Noise levels at different distances can also be affected by a number of factors other than distance from the noise source. Topographic features and structural barriers that absorb, reflect, or scatter sound waves can result in increased or decreased noise levels. Atmospheric conditions (e.g., wind speed and direction, humidity level, and temperature) can also affect the degree to which sound is attenuated over distance. Reflections off topographical features or buildings can sometimes result in higher sound levels (i.e., lower sound attenuation rates) than normally expected. Temperature inversions and changes in wind conditions can at times refract sound waves to locations at considerable distance from the noise source. However, focusing effects are usually noticeable only for intense noise sources such as blasting operations.

4.8.2 Noise Standards

Applicable noise standards in Columbia County are the noise limitation criteria established under Chapter 173-60 Washington Administrative Code (WAC). These criteria limit both the level and duration of noise from a source measured at any point within a receiving property. The maximum permissible environmental noise levels depend on the land use of the property containing the noise source and the land use of the property receiving that noise. For industrially zoned noise sources, such as the proposed generation plant site, these criteria are as follows:

- for receiving properties zoned "residential," "recreational," or "hospital"—60 dBA (7 a.m. to 10 p.m.); 50 dBA (10 p.m. to 7 a.m.);
- for receiving properties zoned "commercial"—65 dBA; and
- for receiving properties zoned "industrial/agricultural"—70 dBA.

At any hour of the day or night, the applicable noise limitation for any receiving property may be exceeded in any 1-hour period by no more than:

- 5 dBA for a total of 15 minutes;
- 10 dBA for a total of 5 minutes; and
- 15 dBA for a total of 1.5 minutes.

Noise resulting from construction activity at temporary construction sites between the hours of 7 a.m. and 10 p.m. is exempt from the provisions of Chapter 173-60 WAC.

The Council and citizens concerned about other projects have voiced concerns regarding the impacts of low-frequency noise. Although there are no regulations regarding this type of noise applicable to the Starbuck Power Project, both the state of Oregon and the city of Seattle have adopted standards for low-frequency noise.

4.8.3 Existing Conditions

There are few noise sources in the vicinity of the plant site. The primary noise sources are wind, traffic on SR 261, and noise associated with the Columbia County Grain Growers storage facility just south of the project site.

Because the project site and surrounding area are rural and sparsely populated, background noise levels at locations distant from traveled roadways are likely to be about 40 dBA under calm wind conditions. Noise levels at locations near roadways such as SR 261 are likely to be somewhat higher.

4.8.4 Environmental Impacts of the Proposed Project

4.8.4.1 Construction

Generation Plant

The primary source of construction noise would be the operation of heavy equipment and support vehicles. Table 4.8-2 lists noise levels produced by various types of construction equipment. Properly maintained equipment will produce noise levels near the middle of the indicated ranges. The types of equipment used for this project (e.g., bulldozers, cranes, and trucks) typically generate noise levels between 80 and 90 dBA at a distance of 50 feet while the equipment is operating (EPA 1971, Toth 1979, Gharabegian 1985).

Construction equipment can operate intermittently or relatively continuously. Assuming that a bulldozer (87 dBA), backhoe (90 dBA), grader (90 dBA), and front-end loader (82 dBA) are operating concurrently in the same area, peak construction period noise would generally be about 94 dBA at 50 feet from the construction site. Locations within 600 feet of a construction area would experience periods when noise levels exceed 70 dBA. Locations within 1,500 feet of a construction area would experience periods when noise levels would exceed 60 dBA. These noise levels would not be continuous and would generally be restricted to daytime hours.

Based on preliminary observations, the closest permanently occupied residence is likely about 1.1 miles northwest of the project site. However, the residence is at the base of a bluff that is between the residence and the site. At a distance of 1.1 miles with intervening terrain to block the line of sight to the facility, it would be highly unlikely that construction noise would be audible at this residence.

Table 4.8-2. Typical Construction Equipment Noise Levels

Type of Equipment	Noise Level in dBA at 50 Feet
Bulldozer	80
Front Loader	72 – 84
Jack Hammer or Rock Drill	81 – 98
Crane with Headache Ball	75 – 87
Backhoe	72 – 93
Scraper and Grader	80 – 93
Electrical Generator	71 – 82
Concrete Pump	81 – 83
Concrete Vibrator	76
Concrete and Dump Trucks	83 – 90
Air Compressor	74 – 87
Pile Drivers (Peaks)	95 – 106
Pneumatic Tools	81 – 98
Roller (Compactor)	73 – 75
Saws	73 – 82
Source: USEPA "Noise from Construction Equipment and Operations"	

Lyons Ferry State Park is located approximately 1.5 miles northwest of the plant site, at an elevation that is approximately 200 feet below the plant site. During most of construction, the more elevated eastern and northern portions of the SPC property would block a straight-line view of equipment used on the ground at the site. This topography and the 1.5-mile distance would likely attenuate the construction-generated sounds that are received at the park, although the sounds may be audible. The anticipated construction noise levels at the park would have to be determined as a part of the SPC noise analysis conducted for their Application for Site Certification.

In addition, construction noise is exempt from regulation under Chapter 173-60 WAC.

Water Pipeline

The primary sources of noise associated with construction of the water pipeline would be construction equipment used to excavate and backfill the pipeline trench. Noise associated with this activity would be similar to that described for construction of the generation plant.

In the town of Starbuck there are several residences close to the proposed water pipeline alignment and construction noise would likely be noticed at those locations. The anticipated

noise levels at these residences would have to be determined as a part of the SPC noise analysis conducted for their Application for Site Certification. However, as noted above, construction noise is exempt from regulation under Chapter 173-60 WAC between 7 a.m. and 10 p.m.

4.8.4.2 Operation and Maintenance

The proposed project would be an industrial activity located in an industrially zoned area. The site is surrounded by industrially zoned property and by the Snake River. The nearest residence is approximately 1.1 miles northwest of the project site. Lyons Ferry State Park is approximately 1.5 miles northwest of the site.

Much of the non-industrially zoned property around the project site is used for agriculture. Agricultural land uses have the same environmental noise designation as industrial property according to the state noise regulation that pertains to Columbia County.

According to the applicable noise regulations, the proposed plant (an industrial noise source) may not generate a sound level exceeding 70 dBA at industrial receiving properties. At residentially zoned and recreational receiving properties, noise generated by the plant would be limited to 60 dBA during daytime hours (7 a.m. to 10 p.m.) and 50 dBA during night hours (10 p.m. to 7 a.m.). Because the proposed plant would operate 24 hours per day, it would need to meet the 50 dBA nighttime limit at residential and recreational receiving properties.

Potential noise sources associated with the proposed facility would include gas turbines, gas turbine generators, heat recovery steam generators, steam turbines, and air-cooled condensers. Table 4.8-3 shows sound levels for various noise sources associated with a similar type of facility proposed at Sumas, Washington. Because sound energy spreads as it radiates away from a source, its apparent loudness also decreases. For a single noise source, the sound level decreases at a rate of approximately 6 dBA per doubling of distance away from the source.

For the similar-sized project proposed at Sumas, the noise impact analysis demonstrated that noise resulting from the proposed project would comply with residential noise limits within approximately 3,000 feet of the project site. Due to the distance to the nearest residential receivers for the Starbuck Power Project (approximately 1.1 miles) and the remoteness of the project area, noise from the proposed facility at the Starbuck site would not likely exceed residential noise limits established by regulation. At Lyons Ferry State Park, noise from the proposed project could be discernible against the relatively quiet background noise environment, but it is unlikely that noise levels would exceed the residential standard. However, SPC would provide more quantitative analyses of sound levels generated and received during operation, including low-frequency noise, in its Application for Site Certification.

Table 4.8-3. Summary of Significant Noise Sources for Proposed Facility at Sumas

Source	# Units	Height (ft)	Approximate Sound Pressure Level at 100 ft (dBA)
Inlet Filter House	2	62	61
Gas Turbine	2	20 (building = 62)	71 (without building)
HRSG – T1&T2	2	33	62
HRSG – B1&B2	2	54	60
Stack Wall	2	75	44
Stack Exit	2	180	64
Rotor Air Cooler	2	26	64
Steam Turbine	1	20 (building = 42)	75 (without building)
Cooling Tower Fan Discharge	3	37	64
Cooling Tower Water Inlet	3	18	65
Condenser Cell	35	47	66
Steam Turbine Transformer	1	34	76 (without noise wall)
Gas Turbine Transformer	2	34	73 (without noise wall)
Station Transformer	2	30	60
Source: EFSEC 2000			

4.8.5 Potential Mitigation Measures

Because noise standards are not expected to be exceeded at residential locations, no mitigation is proposed at this time.

4.9 Land Use

4.9.1 Existing Conditions

The study area for this land use analysis is in Columbia County, Washington. The 100-acre SPC property, which includes the 40-acre generation plant site, is located along the east side of SR 261, south of the Lyon's Ferry Bridge and north of the Columbia County Grain Growers grain elevator.

In addition, an approximately 6-mile-long water pipeline would be constructed from a new well in the town of Starbuck to the plant site. The water line would be located primarily within an abandoned railroad right-of-way that parallels SR 261 from Starbuck to just south of the project site (Figure 3-6). Where it must cross the Tucannon River, the pipeline would be routed north from the abandoned right-of-way to SR 261, where it would run parallel to the roadway, then cross the river suspended from the highway bridge. After crossing the river, the pipeline would be routed back to the abandoned right-of-way. In the vicinity of the plant site, the pipeline route would extend northward from the abandoned right-of-way, pass through an existing culvert under the active Union Pacific Railroad line, and cross SR 261 to the plant site. This would entail crossing an easement, owned by the U.S. Army Corps of Engineers, that borders the west side of the SPC property.

4.9.1.1 Existing Land Use Plans

The following plans and ordinances were reviewed during preparation of this land use analysis:

- Columbia County Comprehensive Plan (April 1996)—The purpose of this comprehensive plan is to provide general guidance for the orderly growth and development of the land and physical improvements within Columbia County. It is further intended to provide a foundation upon which rural, residential, and recreational zoning may be implemented.

- Columbia County Zoning Ordinance (January 1995)—This document provides the zoning maps and allowable uses for and in Columbia County and the guidelines for acceptable uses in those areas. Zoning in the project vicinity is shown on Figures 4.9-1 and 4.9-2.

- Columbia County Shoreline Master Plan (June 1975).

- Town of Starbuck Comprehensive Plan (Guide to Community Development 1995, revised 1998).

Generation Plant Site

The project is located within an area designated as Recommended Industrial Sites in the Columbia County Comprehensive Plan. Within this designation, the plant site is in the area designated as "Snake River Site," and the pipeline extends through an area identified as the "Starbuck Site."

The generation plant site is zoned Heavy Industrial, which allows for the plant to be built with a Conditional Use Permit as outlined in the following portion of Section 15, Heavy Industrial Zone (HI-1), part C:

> *"Conditional Uses Permitted -*
>
> *In an HI-1 Zone the following uses and their accessory uses are permitted when authorized in accordance with the requirements of Section 33 of this ordinance.*
>
> *A use permitted outright in LI-1 Zone.*
>
> *Manufacturing, repairing, compounding, fabricating, processing, packing, or storage of a use not listed in Section 14 of this ordinance.*
>
> *Automotive, wrecking. dismantling, or junk yards.*
>
> *The production of energy except for nuclear facilities and use."* (Columbia County Zoning Ordinance 1995)

Water Pipeline Route

The water pipeline route is the abandoned railroad right-of-way from the town of Starbuck to the end of the abandoned railroad bed near the plant site. It is presently assumed that the pipeline would follow the railroad right-of-way and then cross the Corps property before accessing the plant site.

The water line would cross the Tucannon River, which is a Shoreline of the State (WAC 173-18-110). The Tucannon River has a Rural designation under the county's Shoreline Master Program. There are no Conservancy lands on or near the project area, including the water pipeline.

A Shoreline Substantial Development Permit would likely be required for the entire project by the county if this proposed project were not under the permitting authority of EFSEC.

4.9.1.2 Current Land Uses

Generation Plant and Surrounding Area

Current land use in the vicinity of the SPC property consists primarily of agriculture and range land. The 100-acre SPC property is currently used for grazing.

There are two commercial uses in the vicinity. The Columbia County Grain Growers grain elevators are located adjacent to the southern border of the SPC property, and a marina, operated by the U.S. Army Corps of Engineers/Port of Columbia, is located on the Snake River approximately 1.1 miles north of the property. The primary activities at the Lyon's Ferry grain elevators consist of truck deliveries and storage of grain. The marina provides boat slips and storage, minor camping facilities, and groceries and supplies. Other land uses in the vicinity of the property include:

- Electrical transmission corridors, including two 500-kV BPA transmission lines that essentially bisect the SPC property in an east-west direction, and a 115-kV line owned by Columbia Rural Electric Association (REA) that traverses the approximate center of the property in a north-south direction.

- Transportation corridors, including SR 261, located adjacent to and west of the property, and the Union Pacific Railroad line located several hundred feet west of SR 261.

- A natural gas transmission corridor that passes within approximately 200 feet of the southwestern property boundary. This transmission line is owned and operated by Pacific Gas and Electric.

- The state-owned Lyons Ferry Fish Hatchery located on the Snake River approximately 1.5 miles northwest of the property, downstream of confluence of the Snake and Palouse Rivers.

- Recreational use at Lyons Ferry State Park, located approximately 1.5 miles northwest of the plant site on the north side of the Snake River where it is joined by the Palouse River.

- In addition, the Snake River is used for recreational purposes, primarily fishing and boating, and commerce that consists primarily of barging.

A residence on the project site is currently occupied by a renter. According to SPC, the house will be demolished or used as an office during construction. The nearest off-property residence is at the marina, approximately 1.1 miles to the northwest.

Water Pipeline Route

Current land uses adjacent to the water pipeline route include a small commercial area in the town of Starbuck, farms and rangeland, and open space and industrial uses at the Columbia County Grain Growers elevator. It also appears from field reconnaissance that there is an AT&T cable buried along the abandoned railroad right-of-way, and that the right-of-way may be used as a maintenance road for that buried cable, particularly near Powers Road. According to AT&T (Ortega pers. comm.), the cable is most likely buried the standard 48 inches deep, with an easement extending 5 feet on each side of the cable.

4.9.2 Environmental Impacts of the Proposed Project

4.9.2.1 Generation Plant Site

Construction and operation of the generation plant on the SPC property would require a Conditional Use Permit (CUP) to be in compliance with the existing Columbia County Zoning Ordinance. If SPC does not apply for and receive a CUP from the county prior to submittal of their Application for Site Certification to EFSEC, it will be necessary for EFSEC to determine how to include the CUP process within their application review process.

Construction and operation of the generation plant would reduce the amount of grazing land in the project area by approximately 40 acres. Since SPC would take possession of the farm house on the property, it is anticipated that the remaining 60 acres would not be used for agriculture or grazing and would remain fallow.

4.9.2.2 Water Pipeline Route

Construction and operation of the well and water pipeline would be a permitted use with a Conditional Use Permit because it is an accessory structure to the generation plant (see Section 4.9.2.1). AT&T has indicated (Ortega pers. comm.) that it would require that construction equipment for the water pipeline not use its easement and, if the cable is to be crossed, that boring beneath it would be the preferred procedure. Before construction, SPC would have to coordinate with AT&T to address these and other issues to avoid impacts on its buried cable. Future development in the vicinity of the right-of-way would not be precluded, providing appropriate measures were taken to avoid the pipeline.

4.10 Visual Resources, Light and Glare

This section evaluates the potential aesthetic (visual) impacts of the proposed project. Potential visual impacts include temporary visual changes introduced by construction, operation, and maintenance of the Starbuck Power Project and permanent visual changes caused by the presence of the plant with an associated transmission line and switchyard and the 6-mile water supply pipeline from the town of Starbuck. The project would also require a new well to be drilled in Starbuck.

4.10.1 Evaluation Methods

The methods used to assess scenic resources and evaluate potential visual impacts of the project generally conform to the Visual Management System developed by the U.S. Forest Service, and the Visual Resource Inventory developed by the Bureau of Land Management. Topography, vegetation (size and shape), and developed land uses were reviewed using U.S. Geological Survey quadrangle maps, aerial photos, photographs, and project maps. Field reconnaissance was conducted to determine the general visibility of the project from sensitive viewpoints (residences, travel routes, recreational and public areas, and workplaces). Potential visual impacts were evaluated by assessing the visual quality of the project area, the viewer sensitivity, and the visibility of changes from the sensitive viewpoints. Visual simulations were not developed for this analysis. It is anticipated that SPC would provide simulations in their Application for Site Certification.

For this evaluation, **visual quality** is described as the visual patterns created by the combination of rural character landscapes and industrial and other human-made features. Visual quality in the project area was assessed using the following descriptions:

- **Urban/Developed** – The landscape is common to urban areas and urban/developed fringes. Human elements are prevalent or landscape modifications exist that do not compatibly blend with the natural surroundings (resulting in low visual intactness and unity).

- **Rural** – The landscape exhibits reasonably attractive natural and human-made features/patterns, although they are not visually distinctive or unusual within the region. The landscape provides some positive visual experiences such as the presence of natural open spaces with interspersed agricultural areas (farm fields, etc.).

- **Scenic** – The landscape exhibits distinctive and memorable visual features (e.g., landform, rock outcrops, streams/rivers, scenic vistas) and patterns (vegetation, open space) that may be present in a rural setting.

Viewer sensitivity, for this evaluation, is described as a combination of viewer type, view exposure (number of viewers and view frequency), view orientation, view duration, and viewer awareness/sensitivity to visual changes.

Levels of viewer sensitivity in the project area were assessed using the following general criteria:

- **Low to Moderate** – Viewer types deemed to have low to moderate visual sensitivity include railroad/ transmission line maintenance workers and workers at grain elevators south of the plant site. Indoor workers would have a lower sensitivity than workers who spend more time outside. Work activities for these types of viewers typically demand a focus on a specific task, which can limit awareness or lower sensitivity to the visual setting outside the workplace.

- **Moderate** – Viewer types deemed to have moderate visual sensitivity include travelers and local residents driving in the area, and agricultural/grain elevator workers. Viewer awareness or sensitivity is considered moderate because destination travelers and those engaged in agricultural practices often have a focused orientation or route of travel that exposes them to the project area view on a regular basis.

- **High** – Residential viewers (people who live in Starbuck along the abandoned railroad where the water pipeline would be installed) and recreational viewers (people staying at Lyons Ferry State Park, boaters, and hunters) are considered to have comparatively high visual sensitivity. The visual setting may contribute to the way a specific building or other facility has been oriented, or the enjoyment of the visual experience may be important to these viewers. Views of the project site may be of long duration and high frequency.

4.10.2 Existing Conditions

4.10.2.1 Visual Setting

Traveling south along SR 261 into the Snake River Canyon and Lyons Ferry area, the viewscape consists of a scenic vista of canyon walls and bluffs. The canyon walls, with their shades of brown and tan, rolling hills in the distance, wide open sky, and the river below are the predominant visual features as a traveler crosses the river heading south on SR 261.

Continuing south on SR 261, the plant site lies on the left side of the highway (north), a little more than a mile past the river. The existing viewscape of the plant site consists of small hills and bluffs vegetated with grasses. The 500-kV BPA electric power lines cross the plant site from east to west, and a 115-kV Columbia Rural Electric Association transmission line crosses the site from north to south. These two transmission lines are highly visible and add an industrial element to the area. Rocky bluffs on the opposite bank of the Snake River are visible in places above the rising hills of the plant site. West of SR 261 and across from the plant site, a raised active railroad bed is visible, with rolling hills and steep bluffs in the background.

Just south of the plant site is the Columbia County Grain Growers grain elevator. This facility includes 6 six round, silver and tan structures ranging from approximately 30 to

60 feet tall that also provide a vertical industrial/agricultural element to the area that is consistent with the agricultural community and land use in the area.

Farther south along SR 261, grassy hills with rock outcrops continue to be common, and the Tucannon River with its riparian fringe of trees and shrubs becomes visible on the left as the traveler approaches the town of Starbuck, 6 miles south of the site. More trees and vegetation associated with rural residential areas, such as groves of cottonwoods, are interspersed with pastures and single-family homes in the vicinity of Starbuck.

4.10.2.2 Description of Key Viewpoints

Field reconnaissance suggests that there are five key viewpoints in the area surrounding the plant site, from which the proposed generation plant would be visible to recreationists, workers, and travelers. These key viewpoints are as follows (Figure 4.10-1):

- **Viewpoint 1** looks south from Lyons Ferry State Park across the Snake River toward the plant site, approximately 1.5 miles away. Primary viewers at this viewpoint would be recreationists.
- **Viewpoint 2** looks from the bluff on the east side of the Snake River down onto the plant site. Primary viewers at this viewpoint would be recreationists and possibly maintenance workers on the 500-kV transmission line.
- **Viewpoint 3** looks north from a boat on the Snake River at the southern end of the plant site. Primary viewers at this viewpoint would be recreationists.
- **Viewpoint 4** is at the Columbia County Grain Growers grain elevator, adjacent to the plant site looking north. Primary viewers at this viewpoint would be workers and visitors.
- **Viewpoint 5** is from SR 261 in the project vicinity, looking toward the plant site. Primary viewers at this viewpoint would be travelers.

In addition, the 6-mile-long water pipeline would extend from Starbuck to the south end of the plant. The water pipeline would travel through this area along the west side of SR 261 to the south end of the plant site in the abandoned railroad bed. Construction of the water pipeline would be visible until installation is completed (a 2- to 3-month period).

4.10.2.3 Visual Quality

The visual quality of the plant site is a mix of scenic and rural viewscapes. The canyon walls, bluffs, and the Snake River represent scenic features juxtaposed against the rolling hills of the surrounding area. These features are visible from Viewpoints 1, 2, and 3. Grassy hills provide the rural component of views in the area surrounding the plant site, visible from Viewpoints 4 and 5. The water pipeline route would be visible from Viewpoint 5, along those portions of its 6-mile route from Starbuck where SR 261 overlooks the abandoned railroad bed.

Landscape alterations that have accompanied development in the area such as roads, buildings, structures, and utilities are situated in a random pattern that does not complement the scenic/rural setting.

4.10.2.4 Viewer Types and Sensitivity

Primary viewer types associated with the plant site and water pipeline route include:

- **Residents** – There is a residence on the plant site that will be vacated prior to construction. There are no other known residences from which the plant site would be visible. There are residents with views of the water pipeline route along SR 261 near the town of Starbuck.

- **Highway travelers** – Those driving north and south along SR 261 past the plant site would have a relatively short-duration view of the generation plant (Viewpoint 5). On a daily basis, the number of these travelers is relatively low (average daily two-way traffic is approximately 450.)

- **Recreationists** – Hunters, fishers, boaters, hikers, and other types of recreationists would see the plant site from Viewpoints 1, 2, and 3.

- **Workers** – Agricultural, maintenance, and other types of workers could view the site from Viewpoints 1, 2, and 4.

Based on a review of available information, there are no residences with views of the plant site. Residents along SR 261 in the vicinity of Starbuck are considered to have moderate sensitivity to the water pipeline construction. During the construction period, construction activities would be visible for periods of time to these residents. However, construction would move along the railroad bed as the pipeline is installed and therefore would be viewed by any one residence for only a short period of time. This would also be true for the well derrick that would be visible for a short time to residents in the town of Starbuck.

Recreationists with potential views of the plant include campers at Lyons Ferry State Park (Viewpoint 1), hunters and hikers along the bluffs (Viewpoint 2), and fishers and boaters on the Snake River (Viewpoint 3). Recreationists are considered to have moderate to high sensitivity to the proposed plant because the plant would be fully visible to these viewers, but their views would be of relatively short duration and their attention would be diverted by other activities.

Travelers driving along SR 261 (Viewpoint 5) would be exposed to the plant for a relatively short period of time as they drive past. These travelers could include recreationists using SR 261, residents of the area, and those driving through the area on business. These viewers are considered to have a moderate sensitivity due to relatively short duration of view of the plant site and water pipeline route, and the fact that their attention would be diverted by the activity of driving.

Agricultural workers and truck drivers working at and visiting the grain elevator (Viewpoint 4) would have the potential for frequent exposure to views of the plant, but they would be focused on work-related activities. Therefore, they are considered to have moderate sensitivity.

Maintenance workers who would occasionally travel along the 500-kV transmission line could potentially see the plant from Viewpoints 2 and 5. These workers would be focused on work-related activities and would potentially view the plant for short periods. These workers' visual sensitivity is considered low to moderate.

4.10.2.5 Existing Light and Glare

The only existing sources of light and glare in the plant site vicinity are the Columbia County Grain Growers grain elevators. The marina and the fish hatchery on the bank of the Snake River also contribute light to the area at night.

4.10.3 Environmental Impacts of the Proposed Project

4.10.3.1 Construction

Construction of the generation plant would take approximately 24 months. Heavy equipment that would remain on the plant site during construction would include earthmovers, bulldozers, dump trucks, delivery trucks, stationary and mobile cranes, backhoes, pickup trucks, and worker vehicles. Although there is a relatively long construction period (2 years), there would be relatively few viewers and the majority of viewers would see the site for a short duration. Therefore, the overall potential visual impact from construction of the generation plant would not be significant.

Visual impacts associated with construction of the water pipeline could include removal of some vegetation, excavating the trench, and the presence of construction equipment. Potential visual impacts would not be significant since the construction of the water pipeline and well would progress at a relatively fast pace along the 6-mile route.

4.10.3.2 Operation and Maintenance

The project would result in long-term changes to the visual environment by introducing a generation plant with four 150-foot stacks, a switchyard, and associated facilities on 40 acres. The plant would be visible to recreationists, travelers, and workers in the five key viewing areas. The overall potential visual impact would likely not be significant because (1) the plant is an industrial use, as is the adjacent grain elevator facility, although the proposed project is larger and not associated with the agricultural community; and (2) there would be relatively few viewers and the majority of viewers would see the site for a short duration.

To help reduce the visual impact of the plant, the design plans include using downward-pointed lights to reduce the glow of the facility at night and painting buildings a color that blends into the landscape.

4.10.3.3 Light and Glare

At night, outside lighting at the generation plant could be visible from all five viewpoints, including the possibility of flashing warning lights on the stacks. During daylight, there is potential for glare off windows and metallic elements of the plant. The overall impact of light and glare would not be significant because there would be relatively few viewers and the majority of viewers would see the site for a short duration.

4.10.4 Potential Mitigation Measures

The following mitigation measures would reduce potential visual impacts:

- Development and implementation of a landscape plan would help block and soften views of the plant and switchyard.
- Planting trees along the northern and eastern portions of the plant site boundary would reduce visual impacts to viewers at Viewpoints 1, 2, and 3.

4.11 Population, Housing, and Economics

4.11.1 Existing Conditions

The project would be located in Columbia County, where there is the limited availability of housing and public services and utilities. Therefore, the potential socioeconomic effects of the proposed project could occur on a regional basis. Construction and operational workforces generally will travel up to about 75 miles, or a 1.5-hour commute, to work. Counties lying within 75 miles of the project site consist of Columbia, Walla Walla, Franklin, Asotin, and Garfield Counties and they define the study area evaluated in this analysis.

Since the impact of the construction workforce could be significant, this section provides a more detailed analysis of population, housing, and economics than might be warranted at a different geographic location. Data presented in this analysis are primarily from the 1990 census, the most recent data available when the EA was prepared.

4.11.1.1 Population

The population levels in the study area experienced growth until the 1970s when growth leveled off or temporarily declined. As an example, Columbia County has had between 4,060 and 4,160 people since 1980 (U.S. Bureau of Census 2000).

In 1998, the total population for the five-county study area was 127,913 people (Table 4.11-1). Columbia County had the second lowest population level in the study area with 4,158 people. Dayton and Starbuck, the largest towns in the county, had populations of 2,484 and 184, respectively. The populatons in the remaining counties included 53,641 in Walla Walla County, 46,511 in Franklin County, 21,286 in Asotin County, and 2,317 in Garfield County. (U.S. Bureau of Census 2000.)

From 1990 to 1998, the study area and the State of Washington experienced similar high (i.e., greater than 2% per year) average annual population growth, with 2.1 and 2.3%, respectively. Population increases varied from a low (i.e., less than 1% per year) of 0.4% average annual growth in Columbia and Garfield Counties to a high of 3.0% average annual growth in Franklin County. Within Columbia County, Starbuck had a 1.0% average annual growth rate and Dayton had a 0.1% increase for the same period. In 1990, Columbia County had a population of 4,024. Dayton and Starbuck had 1990 populations of 2,468 and 170, respectively. (U.S. Bureau of Census 2000.)

From 1980 to 1990, the study area experienced a low average annual population increase of 0.4%, less than the moderate (i.e., 1 to 2% per year) 1.8% average annual increase for the State of Washington. Overall, the population in the study area increased from 105,808 to 109,789. More specifically, some of the counties in the study area experienced population declines while others experienced minor increases. Garfield County had an average annual population decline of 0.9% and Columbia County had an average annual decline of 0.1%. In

contrast, the remaining counties had low average annual population increases of 0.2 to 0.7%. (U.S. Bureau of Census 2000, OFM 1987.)

Table 4.11-1. Study Area Population Changes

County/City	1980	1990	Average Annual % Change 1980-1990	1998	Average Annual % Change 1990-1998
Columbia County	4,057	4,024	-0.1	4,158	0.4
Starbuck	198	170	-1.4	184	1.0
Dayton	2,565	2,468	-0.4	2,484	0.1
Walla Walla County	47,435	48,439	0.2	53,641	1.3
Walla Walla	25,619	26,478	0.3	28,820	1.1
Franklin County	35,025	37,473	0.7	46,511	3.0
Pasco	18,428	20,337	1.0	27,546	4.4
Kennewick	34,398	42,155	2.3	50,175	2.4
Richland	33,578	32,315	-0.4	37,263	1.9
Asotin County	16,823	17,605	0.5	21,286	2.6
Clarkston	6,903	6,753	-0.2	7,247	0.9
Garfield County	2,468	2,248	-0.9	2,317	0.4
Pomeroy	1,716	1,393	-1.9	1,445	0.5
Study Area Total	105,808	109,789	0.4	127,913	2.1
Washington State	4,132,353	4,866,692	1.8	5,756,361	2.3
Sources: U.S. Bureau of Census 2000; OFM 1987					

The 1990 Census reports indicate that the age group with the highest representation in Columbia County (32%) was the 20 to 44 age bracket. This compares to the City of Starbuck where the 20 to 44 age bracket also had the highest representation at 33%. The median age was approximately 35 years in Columbia County and 36 in the town of Starbuck. Garfield County had a median age of approximately 40 years, Asotin County had 34 years, Franklin had 25 years, and Walla Walla had a median age of 29 years.

4.11.1.2 Housing

Housing and occupancy status in 1990 (the most recent data available when this EA was prepared) for Starbuck, Columbia County, and the neighboring cities and counties is shown in Table 4.11-2. Vacancy rates are also given, with 5 to 6% considered to be low vacancy, 8 to 10% moderate, and 11% or more a high rate of vacancy.

Table 4.11-2. Housing Units, Occupancy, and Vacancy, 1990

County/City	Total Units	Occupied Units	Vacant Units	Percent Vacant
Columbia County	2,046	1,582	464	22.7
Starbuck	105	79	26	24.8
Dayton	1,154	994	160	13.9
Walla Walla County	19,029	17,623	1,406	7.4
Walla Walla	10,630	9,901	729	6.9
Franklin County	13,664	12,196	1,468	10.7
Pasco	7,698	6,842	856	11.1
Kennewick	17,209	16,074	1,135	6.6
Richland	13,850	13,140	710	5.1
Asotin County	7,519	7,003	516	6.9
Clarkston	3,043	2,854	189	6.2
Garfield County	1,209	922	287	23.7
Pomeroy	699	624	75	10.7
Study Area Total	43,467	39,326	4,141	9.5
Source: U.S. Bureau of Census 2000				

In 1990, there were a total of 2,046 housing units in Columbia County, 105 units in Starbuck, and 1,154 units in Dayton. Of the total units, Columbia County had 215 units used for seasonal, recreational, or occasional purposes. There were an additional 41,421 total housing units in the remainder of the study area. (U.S. Bureau of Census 2000.)

Of the total 43,467 housing units in the study area, 39,326 were occupied and 4,141 were vacant. The vacancy rate for the study area was 9.5%, a moderate vacancy rate. Vacancy rates for the counties ranged from 6.9 to 23.7%, low to very high, with Columbia County having 22.7% vacancy. Starbuck had a 24.8% vacancy rate and Dayton had 13.9%. (U.S. Bureau of Census 2000.)

Over half of the housing units in Columbia County are more than 50 years old, which typically indicates an upcoming need for renovation and updating. Some of the existing units may be vacant as a result of this need for renovation. In general, however, most of the housing in the county appears to be in good condition. (Columbia County 1996.)

The median home price in Columbia County in 1997 was $50,000. Rental rates for one-, two-, and three-bedroom units were $275 to $300/month, $375 to $450/month, and $400 to $600/month, respectively. (Columbia County 1996) In comparison, the medium housing price in Columbia County in 1990 was $37,600 and median gross rent was $445/month.

4.11.1.3 Employment and Economics

A total of 1,570 people were employed in Columbia County in 1990. Table 4.11-3 provides 1990 employment levels for Columbia County, by industry and for employed persons 16 years and older (U.S. Bureau of Census 1990).

Table 4.11-3. Columbia County 1990 Employment by Sector for Persons 16 Years and Older

Industry	Number Employed	% of Total workforce
Agriculture, forestry, fisheries	330	21.0
Mining	7	0.4
Construction	108	6.9
Manufacturing	293	18.7
Nondurable goods	238	15.2
Durable goods	55	3.5
Transportation	38	2.4
Communications, Public Utilities	47	3.0
Wholesale Trade	16	1.0
Retail Trade	167	10.6
Finance, Insurance, Real Estate	40	2.5
Professional Services	442	28.2
Business and Repair Services	21	1.3
Personal Services	35	2.2
Entertainment and Recreation Services	45	2.9
Health Services	144	9.2
Educational Services	133	8.5
Other professional and related services	64	4.1
Government/Public Administration	82	5.2
County Total	1,570	99.9*

* Does not equal 100% due to rounding.
Source: U.S. Bureau of Census 1990.

Overall, the greatest employment sectors in Columbia County in 1990 were professional services at 28.2% of the employment; agriculture, forestry, and fisheries at 21.0%; and manufacturing at 18.7%. Employment in other sectors, particularly wholesale and retail trade, is less than the proportion found throughout most of Washington State.

As indicated by these percentages, Columbia County's economy is heavily concentrated in the traditional industries of agriculture and food processing (i.e., nondurable manufacturing), both of which are highly seasonal as well as cyclical. This industrial employment distribution results in the county having a higher than average unemployment rate, when compared to the state average. Columbia County's unemployment rate was estimated to be high, about 13.3% in April 1999, compared to 4.4% for the State of Washington (Business Development Concepts 1999). In conjunction with seasonal food processing employment, the unemployment rate can go from a low of 5% in June or July up to a very high 20% in February and March.

Major employers in the county include (Dayton Chamber of Commerce 2000)**:**

- Seneca Foods Corporation: 1,200 to 1,400 seasonal, 58 full-time year-round;
- Bluewood Ski Resort: 160 seasonal, 9 full-time year-round;
- Dayton General Hospital: 150 employees;
- Columbia County: 131 employees;
- Dayton School District: 90 employees;
- Federal Government: 58 employees; and
- Columbia Cut Stock: 40 employees.

For 15 of the last 21 years, the per capita income of Columbia County has exceeded that of the state. Good crop years drive up per capita income sharply but have little effect on the average annual wage. (Columbia County 2000.) Per capita incomes for the state and nation in 1989 were $14,923 and $14,420, respectively. In 1989, per capita income in Columbia County was $11,108. This is lower than the state and nation for this year, probably as a result of the lower average salary and much higher unemployment rates (13.3% in Columbia County in 1999 versus 4.4% for Washington).

However, Columbia County's per capita income is comparable to the other four counties in the study area. Per capita income in 1989 for the neighboring counties was $11,508 in Walla Walla County, $10,407 in Franklin County, $11,379 in Asotin County, and $12,209 in Garfield County. (U.S. Bureau of Census 2000.)

4.11.2 Impacts of the Proposed Project

4.11.2.1 Construction

Generation Plant

Total cost of construction is estimated to be $536 million. The peak construction workforce would be about 550 individuals. Because SPC has not indicated where the workforce would originate from or where they would be housed, the negative project impacts on Columbia County and Starbuck could range from minor to significant.

Population

Because of the lack of an available workforce in Columbia County, SPC would likely have to hire much of its workforce from throughout the project study area, elsewhere in the State of Washington, and possibly from other states. As discussed earlier, the study area is defined by a commuting distance of 75 miles and, in addition to Columbia County, would include Walla Walla, Franklin, Asotin, and Garfield Counties.

As noted earlier, the peak construction workforce would be 550 individuals. Based upon historical studies (Weber and Howell 1982), this construction workforce would generate a total of 825 direct and indirect jobs, assuming a multiplier of 1.5. Over the 24-month plant construction period, the average labor force would be approximately 300, resulting in a total of approximately 450 direct and indirect jobs.

The largest and most experienced labor pool from which workers would likely originate or commute would be the Tri-Cities (Pasco, Richland, and Kennewick), Walla Walla, and possibly the Lewiston/Clarkston areas.

If this peak direct and indirect workforce originates from outside the study area and is housed in Columbia County, it would represent a 20% increase compared to the 4,158 estimated to be living in the county in 1998. As a result, the proposed project would have a significant impact on population levels in Columbia County and Starbuck.

However, if most of the construction workforce is hired from throughout the existing study area labor pool and continues to reside at their current locations, they could commute to the plant site on a daily basis. In that situation, much of the potential population increases to Columbia County and Starbuck would be negligible. Even if all 825 workers were immigrants into the study area from throughout the state or nation, rather than being existing residents, they would represent less than a 1% increase in the population levels of the five-county area and would not have a significant impact.

Housing

Because of the small total number of housing units in Starbuck, and the fact that 26 units (out of 105) were available in 1990, either SPC would have to build temporary housing for the construction workforce, or workers would have to commute on a daily basis from throughout the county or the project study area. In some cases, workers may decide to camp at regional campgrounds that allow overnight camping, thereby displacing and having a significant impact on existing recreational users.

As discussed earlier, in 1990 Columbia County had a total of 2,046 housing units, of which 464 or 22.7% were vacant. If housing stock and vacancies are similar to this during construction, this could provide enough housing for a considerable portion of the workforce. It is likely that this would eliminate most if not all of the available housing in the county and create a temporary housing shortage.

As stated above, the largest and most experienced labor pool from which workers would commute would be the Tri-Cities (Pasco, Richland, and Kennewick), Walla Walla, and

possibly the Lewiston/Clarkston areas. In 1990, the study area had a total of 43,467 housing units, of which 4,141 or 9.5% were vacant. This represents a moderate vacancy rate that can accommodate the Starbuck Power Project workforce. It is unknown whether workers within commuting distances would be willing to temporarily relocate while working on the project, rather than commute on a daily basis.

Employment and Economics

The total construction payroll would be $24 million, with an average wage of $16.49 per hour plus benefits (compared to an average wage of $9.98 per hour in Columbia County in 1997). In addition to the direct labor force, there would be an estimated additional 275 indirect jobs created by the project.

Columbia County's unemployment rate was estimated to be high, about 13.3% in April 1999, compared to 4.4% for the State of Washington (Business Development Concepts 1999). Although this means that several hundred people are unemployed in the county, this is not a large enough number of workers to provide the peak workforce needed for the project. In addition, the available workforce probably would not have the required training and skills to perform many of the construction tasks. However, the project would have a positive impact on the county's economy by providing jobs to at least some qualified unemployed county residents, potentially lowering the unemployment rate significantly during the 2-year construction period. Although positive economic impacts would also occur in the remainder of the study area, the effect would not be as great.

Water Pipeline

During construction of the water pipeline, the peak workforce would be approximately 40 individuals, and construction of the pipeline would be completed in 2 to 3 months. The peak workforce for the pipeline is expected to occur much earlier in the construction period than the peak workforce for the plant. The 40-person peak workforce would be approximately 13% of the average generation plant construction workforce and would last only 2 to 3 months. Therefore, the influence of construction of the pipeline on population, housing, and economics can be considered to be included in the discussion above for construction of the generation plant.

4.11.2.2 Operation and Maintenance

Operation of the project would result in a full-time workforce of 35 individuals. This would result in a positive impact on employment, income, and the overall economy in Starbuck and Columbia County.

Population

In addition to the 35-person project workforce, family members would also migrate into the project area. If all 35 employees had families that relocated to the area, and if there were 2.1 family members per worker (based on 3.06 people total per family for Washington State),

a total of about 74 family members would also migrate into the county. Thus, the project could result in a total of 109 people moving into the county during the operation of the project.

Assuming that all of these people moved into the Starbuck area from the study area or the state, this would result in a direct increase of less than 1% of the county's 1998 population levels. This does not represent a significant impact to the county. However, if all of these families moved into the town of Starbuck, the population would increase by approximately 59% and would increase the significance of the impact.

Housing

Housing for the 35 employees and their families would not result in a significant impact on housing in Starbuck and Columbia County. In 1990, there were 26 vacant housing units in Starbuck and 464 vacant units in Columbia County. If the employees and their families used only existing housing, this would be adequate to meet the housing needs of the operational workforce and there would not be an impact on housing.

Employment and Economics

Increased employment, income, and local expenditures resulting from operation of the Starbuck plant would positively impact Columbia County, local businesses, and the state. Annual operational payroll would be about $1.838 million per year, with a total over the 30-year life of the project of $22.8 million. The average wage would be $16.83 per hour plus benefits. (Project economic data are from Business Development Concepts 1999.)

Previous studies (Weber and Howell 1982) have shown that one direct operational job for a power plant typically would generate 0.8 indirect jobs (i.e., a 1.8 multiplier). Using this assumption, an estimated 30 indirect jobs would be generated by operation of the Starbuck Power Plant and would likely be located within Starbuck and other portions of Columbia County. Although these indirect jobs generated by the project could employ some of the 74 family members of the operational workforce, this employment would help to reduce unemployment in the area, although not significantly.

4.11.3 Potential Mitigation Measures

4.11.3.1 Construction

SPC should determine where the primary the labor pool would be for the construction workforce, whether or not the labor force would in-migrate, and where workers would be housed. If the workforce is housed throughout the five-county study area, SPC should determine how workers would be transported to the project site. If the workforce is to be housed locally, SPC should indicate what provisions would be made to provide such local housing (such as a company-provided trailer park). The potential resulting impacts to services and utilities, versus that needed for a commuting workforce, might require

preliminary payments in lieu of taxes, or additional mitigation fees might be required to mitigate these impacts.

4.11.3.2 Operation and Maintenance

No additional mitigation would likely be necessary during operation because of the minimal direct workforce and anticipated indirect in-migration, and because of the relatively large amount of tax revenues that would be generated to address those impacts (see Section 4.12).

4.11.4 Environmental Justice

4.11.4.1 Existing Conditions

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," requires that impacts to minority and low-income populations be specifically evaluated for all projects on federal lands, requiring federal permits, or obtaining federal funding. Since BPA will likely be committing federal funds for this project (transmission lines and a switchyard), environmental justice is addressed in this Environmental Assessment. This section describes the ethnic composition and poverty status of residents in the study area.

The study area, like the State of Washington, contains primarily Caucasians, with a large number of Hispanics and about equal numbers of African-Americans and Native Americans (Table 4.11-4). Columbia County is 96% Caucasian, with Garfield County at 99%, Asotin County at 98%, Franklin County at 72%, and Walla Walla County at 90%. In comparison, the state is composed of 88.6% Caucasians.

Table 4.11-4. Race by County, 1990

County	Caucasians	African-Americans	American Indian, Eskimo, Aleut	Asian or Pacific Islander	Other
Columbia	3,874	0	25	6	119
Garfield	2,229	0	10	9	0
Asotin	17,229	52	204	52	68
Franklin	26,973	1,203	349	887	8,061
Walla Walla	43,374	684	278	676	3,427
Study Area Totals	93,679	1,939	866	1,630	11,675
Washington State	4,313,601	147,364	83,212	211,292	111,223
Source: U.S. Bureau of Census 2000.					

The number of people below the poverty level in 1990 is shown in Table 4.11-5. Only Garfield County has a similar percentage of its population below the poverty level as the State of Washington, 10.3% versus 10.6%, respectively. Counties in the study area had much greater numbers of their population below the poverty level, ranging from 14.7% in Walla Walla County to 22.7% in Franklin County.

Table 4.11-5. Poverty Status by County, 1990

County	Total 1990 Population	Number Below Poverty	Percent Below Poverty
Columbia	4,024	757	18.8
Garfield	2,248	231	10.3
Asotin	17,605	3,331	18.9
Franklin	37,473	8,491	22.7
Walla Walla	48,439	7,144	14.7
Study Area Totals	109,789	19,954	18.2
Washington State	4,866,692	517,933	10.6
Source: U.S. Bureau of Census 2000.			

4.11.4.2 Impacts of the Proposed Project

Construction

Construction of the project would not displace or negatively affect minority or low-income people. The project could result in a minor benefit if minority or low-income people became part of the construction workforce, thereby benefiting economically.

Operation and Maintenance

Because of the small size of the operational workforce and the localized impacts, minority and low-income people would not be negatively affected by the project, and any beneficial impacts to these populations would also be negligible.

4.11.4.3 Potential Mitigation Measures

Because no negative impacts would occur to minority and low-income people as a result of construction or operation of the proposed project, no mitigation measures would be required.

4.12 Public Services and Utilities

Sources of information reviewed to prepare the following sections included the Columbia County Comprehensive Plan, personal communications with Dayton and Starbuck Public Schools staff, and the www.historicdayton.com website.

4.12.1 Existing Conditions

4.12.1.1 Police

The Columbia County Sheriff's Department is located in Dayton and has nine officers and seven reserve officers (Columbia County 1996).

4.12.1.2 Fire Services

Columbia County has three fire districts. They are staffed either primarily or solely by volunteers:

- District 1, Starbuck, approximately 6 miles from the proposed site, has a volunteer staff of 25, with a paid fire chief and secretary.
- District 2 is in the western portion of the county. The primary fire-fighting coverage for District 2 is provided by the Waitsburg Fire Department, located about 45 miles from the plant site in Walla Walla County. The Waitsburg Fire Department has a joint operating agreement with Columbia County, covering the most western section of Columbia County. District 2 has a volunteer staff of 35.
- District 3 is Dayton and is located just outside of the town, approximately 25 miles from the proposed site. District 3 has a volunteer staff of 26. (Turner pers. comm.)

4.12.1.3 Emergency Medical Services

Enhanced 911 emergency service is available countywide. The Columbia County Hospital District has 107 full-time and 9 part-time employees at their hospital in Dayton, approximately 25 miles from the proposed site. This includes two family practice physicians, one internal medicine physician, one emergency room physician, three physician assistants, and one nurse practitioner. The hospital also has a 28-bed acute care facility, a 20-bed private pay convalescent home, and a 36-bed Medicare/Medicaid nursing home staffed with skilled nursing care. Emergency room care is maintained 24 hours a day, 7 days a week, with services that include a home health agency, lab, x-ray, and physical and respiratory therapy. If the hospital is not able to provide advanced or special care needs, a helicopter is used for medical evacuations. In such situations, patients are flown to either Sacred Heart or

Deaconess hospital in Spokane, approximately 100 miles north-northeast of Dayton. (Columbia County 1996.)

There is also a 29-bed congregate care facility that operates two rural clinics in Dayton and Waitsburg. Columbia County also has a dentist, optometrist, and two chiropractors. (Columbia County 1996.)

4.12.1.4 Schools

Columbia County has two school districts, Dayton and Starbuck. Dayton School District provides education for preschool to grade 12 students and has a current enrollment of 600. The school district has the capacity to accommodate an estimated 800 or more students. Starbuck School District provides education for kindergarten through eighth grade, currently has 17 students enrolled, and could accommodate about 50 to 60 students. In addition, the school district operates a preschool/special education preschool program. (Columbia County 1996.)

Private schools in the area include Blue Mountain Christian School (K to 7) and The Learning Center (9 to 12). Nearby colleges and universities include Walla Walla Community College in Walla Walla, Washington State University in Pullman, Whitman College in Walla Walla, and Lewis and Clark State College in Lewiston, Idaho.

4.12.1.5 Parks and Recreation

Columbia County has a diverse landscape, ranging from rolling fields of wheat to extreme mountain wilderness areas. The northern border is the Snake River at 540 feet above mean sea level (MSL). The southern border is the state line with the State of Oregon and features Oregon Butte at an elevation of 6,401 feet MSL.

The project area provides many recreational opportunities. Table 4.12-1 provides a partial listing of facilities and activities available within a reasonable travel distance of the project site. As can be seen in the table, the area has 3 forests or wilderness areas; 5 wildlife areas and refuges; 8 boat launches, beaches, and other water uses; 10 state parks, other parks, and campgrounds; 2 museums; and 1 ski area. Not far from the Blue Mountains of southeastern Washington, this area offers outdoor recreational activities such as camping, hiking, fishing, and hunting. The Ski Bluewood Winter Activities Area (20 miles south of Dayton) features skiing and snowmobiling in the winter. The Tucannon lakes, Tucannon River, Touchet Rivers, and Snake River also offer fishing.

Table 4.12-1. Parks and Recreational Facilities and Activities in the Study Area

Facility	Location	Facilities/Activities
W.T. Wooten Wildlife Area	Columbia County	Hunting, 16,700 acres
Camp William T. Wooten State Park	Columbia County	Campground, environmental learning center, 24 campsites. Fishing, hiking and snowmobiling in vicinity.
Umatilla National Forest	Columbia County	Blue Mountains, Forests, hiking, etc.
Lewis & Clark Trail State Park	Columbia County	Beaches, Swimming, Picnic shelters, 30 campsites, fishing, and park (forested area)
Mountain Home Park	Columbia County	County Park
Wenaha Tucannon Wilderness	Columbia County (in Umatilla Nat'l Forest)	177,469 acres of Forests and Wilderness Areas, 175 miles of hiking trails.
Godman	Columbia County	Public Campground
Ski Bluewood	Columbia County	Skiing and Snowmobiling
Teal Springs	Garfield County	Public Campground
Alda Thicket	Garfield County	Public Campground
Wickiup	Garfield County	Public Campground
Palouse Falls State Park	Whitman County	Picnic area, 190 ft. Palouse Falls viewing, 10 campsites with 10-day max. stay. Closed in winter
Lower Monumental Dam	Snake River, Franklin County	Nonrestricted boat launch
Lower Monumental Dam	Snake River, Walla Walla County	Moorage
Windust Park	Snake River, Franklin County	Nonrestricted boat launch, moorage
Fishhook Park	Snake River, Franklin County	Nonrestricted boat launch, beaches
Levey Park	Snake River, Franklin County	Nonrestricted boat launch, beaches
Charbonneau Park	Snake River, Walla Walla County	Nonrestricted boat launch, beaches
McNary Wildlife Refuge	Burbank Slough, Columbia River, Walla Walla County	This refuge is 41,555 acres and offers hunting.
Whitman Mission National Historic Site	Walla Walla County	Museum, exhibits, self-guiding trails

Facility	Location	Facilities/Activities
Umatilla National Forest	Walla Walla County	1,400,000 acres, horseback riding, hiking, snowmobiling, snow shoeing, fishing, off road vehicles, downhill and cross- county skiing, hunting and camping.
McNary Wildlife Area	Walla Walla County	East of Walla Walla
Asotin Creek Wildlife Area	Asotin County	Hunting
Fields Springs State Park	Asotin County	Forested Area
Chief Timothy State Park	Snake River, Asotin County	Beaches (swimming), parks
Alpowai Interpretive Center	Snake River, Asotin County	Historic Sites & Museum, moorage, nonrestricted boat launch site
Chief Joseph Wildlife Area	Asotin County	Hunting
Swallows Park	Snake River, Asotin County	Beaches (swimming), nonrestricted boat launch site
Chief Looking Glass Park	Snake River, Asotin County	Beaches (swimming)
Source: Washington Atlas and Gazetteer, 1998.		

Located 2 miles northwest of the plant site on SR 261 in Franklin County, Lyons Ferry State Park is at the confluence of the Palouse and Snake Rivers. The park covers 1,282 acres, including Marmes Rock Shelter Heritage Area. The Washington State Parks and Recreation Commission has designated this shelter a heritage site. Facilities include 50 standard campsites (no hookups) with a maximum stay of 10 days, 21 picnic sites, 6 picnic shelters, 2 primitive sites, a trailer dump station, a bathhouse in the day-use area, 2 comfort stations (1 in the campground area and 1 in the boat launch area), 2 boat launch ramps, 428 feet of unguarded beach, 2 residences, a storage shed, and a shop. Recreational activities in the park include boating, camping, fishing, hiking, picnicking, swimming, and water skiing. This park is closed in the winter. (Washington State Parks and Recreation Commission 2000.)

Lyons Ferry Marina and Recreation Area is located 1.5 miles northwest of the plant site in Columbia County and offers boating, water skiing, jet skiing, and a day-use area. The Port of Columbia operates the marina. Facilities include a one-lane boat launch ramp, boat handling dock, tie-up dock, crib wall, marine dump station, open moorage, covered moorage, boat dry storage, marine fuel and gasoline, marine accessories, and a restaurant. The day-use area has many facilities including, but not limited to, flush toilets, hot showers, drinking water, fire pits and grills, public phones, and a store. The camping area has 40 tent sites, 18 RV-only sites (with electric, water, and sewer), 58 additional developed sites, a trailer dump station, and fire pits and grills. Camping fees are $10.00 for tents and $14.00 for RVs. This 37-acre facility is generally open year-round (except for Tuesdays), with summer hours from 7 a.m. to 7 p.m. and winter hours from 8 a.m. to 6 p.m. (U.S. Army Corps of Engineers, Walla Walla District 2000.)

Dayton has a nine-hole golf course and a large city park. The city park has a scenic path beside the Touchet River that is used by walkers and bikers. The park also has summer swimming facilities, a tennis court, and playground equipment.

4.12.1.6 Public Utilities

Electrical services within Columbia County are provided by Inland Power and Light, Pacific Power and Light, and Columbia Rural Electric Association (REA). It is projected that there is enough facility capacity and power to meet population growth in the near future (Columbia County 1996).

4.12.1.7 Communications

Quest Communications provides telephone service within Columbia County. Starbuck obtains its telephone service from Pioneer Telephone, Inc. (PTI).

Newspapers published and/or distributed in the area include the Touchet Valley Graphic Community Newspaper, Dayton Chronicle, Walla Walla Union-Bulletin Daily, and Tri-City Herald Daily.

Television service is provided by the Touchet Valley Television Cable System, including access to 31 channels. Reception of radio station transmissions varies throughout the region.

4.12.1.8 Water Supply

The SPC property currently has potable water available from a well located just west of the property boundary in the vicinity of the residence on the property. Water could also be provided to the project site from the town of Starbuck's municipal domestic supply. Starbuck has water rights for 270 gallons per minute (gpm) from their two wells, and the town is using 15% of capacity on an annual average (Shantie pers. comm.).

4.12.1.9 Sewage/Solid Waste Disposal

The town of Starbuck operates a treatment plant for gray water. The plant was recently upgraded and could be expanded an additional 15% if needed (Shantie pers. comm.). All of the homes, schools, and public buildings in Starbuck have onsite septic systems for sewage disposal.

Most Columbia County residents have garbage collection services available. Columbia County owns and operates a solid waste transfer station, which is used by the City of Dayton and most rural residents. Starbuck's solid waste collection services are contracted to a private company called Empire Disposal. City and rural-area solid waste is then transported directly out of the county to Arlington, Oregon. (Columbia County 1996.)

4.12.2 Impacts of the Proposed Project

4.12.2.1 Construction

The peak labor force for the project would be approximately 550 individuals for about a 3-month period. Over the 24-month plant construction period, the average labor force would be approximately 300. Because of the rural nature of the area, accommodation of a workforce of this size would be difficult without the county and local communities incurring increased costs and experiencing negative impacts.

Because SPC is in the preliminary stages of project development, they have not developed a plan for housing and transporting this workforce. Therefore this section of the Environmental Assessment addresses a range of potential impacts associated with the construction workforce. In their Application for Site Certification, SPC would be required to provide workforce housing and/or transportation plans that minimize workforce impacts on public services and utilities.

Public Services and Utilities

Public services and utilities could be significantly affected by in-migration of the construction workforce because (1) there is a significant lack of housing in the nearest town, Starbuck, (2) there does not appear to be enough temporary housing available in Columbia County overall, and (3) it is unknown where the workforce would be housed. (See Section 4.11 for a discussion of housing issues.)

As described in Section 4.11, providing services for the construction workforce would result in indirect jobs being created in the county. Based on a 1.5 multiplier, the total worker population increase during the construction peak would be approximately 825, consisting of both direct and indirect jobs. This would be a 20% increase in the population of the Columbia County. Based on an average workforce of 300, there would be a total worker population increase of approximately 450 for a 2-year period. Depending on how these workers are housed and where, the population increase could have a significant negative impact on the ability of the county and Starbuck to provide police, fire, emergency medical, and educational services to the new residents. Existing facilities and staff are minimal and do not likely have the capacity to address such a large increase in service needs. In addition, local police, fire, and emergency medical facilities would not likely be able to meet the demands placed on them if there were a sizeable fire or a major construction accident at the power plant. These service providers may have to increase staff levels, facilities, and equipment to meet these new demands. If workers bring their families, Dayton schools appear to have the capacity to accommodate the temporary increase, but the Starbuck school may not.

The costs of providing these services could be somewhat mitigated by the $3.252 million increase in county sales taxes and $21.142 million increase in state sales taxes that would be generated by the project during construction (tax data from Business Development Concepts 1999). However, some of these public services (i.e., school districts) are funded with property and other taxes and would experience temporary revenue shortfalls due to the need

for immediate payments. These shortfalls would either require that additional mitigation be implemented, or that some prepayments in lieu of taxes be made.

At this time, until further information is available about the housing plan for the proposed project, the adequacy of water, telephone, sewage, and solid waste services available to meet the project workforce needs is unknown. If a large workforce migrates into the area, the delivery of new electrical services could require coordination between the county and the three service providers to assure that electrical needs are met.

Parks and Recreation

Because of a significant lack of available housing in Starbuck and Columbia County, and uncertainty about how and where construction workers would be housed, workers may decide to camp at parks and campgrounds that allow camping overnight. The workforce could displace and could have a significant negative impact on existing recreational users. State campground regulations now limit overnight stays to 10 days, and campgrounds are operating at capacity during the summer on a first-come, first-served basis (Mullen pers. comm.).

In addition, it is possible that construction workers would take advantage of the recreational opportunities within the county or throughout the region when not working. Areas most likely to be affected include boat launches and beaches, wildlife areas and refuges, and forest or wilderness areas.

4.12.2.2 Operation and Maintenance

During operation, the Starbuck Power Project would have 35 full-time employees. Assuming that all of these people moved into the area, which may not be the case, and that there would be 2.1 family members per worker (see Section 4.11.2.2), a total of about 74 family members would migrate into the area. This would result in a total of 109 people moving into the county during the operational phase.

Public Services and Utilities

The need for public services and utilities would depend on where the operational workforce resides and whether or not they use existing housing or construct new housing. If housing stocks at the onset of operation are similar to the conditions present for the 1990 census, there appears to be adequate housing in Columbia County to meet the needs of the 35 new families. The needs of the 109 new residents would not likely result in a significant impact on the daily provision of services and utilities.

SPC has already entered into an agreement with the town of Starbuck to use their municipal wells and water system to meet plant needs. The water system is currently operating at 15% capacity so enough capacity exists to meets plant needs, as well as that of future population growth.

Wastewater from the project would be treated and discharged onsite. Potential increases in wastewater generation from a potential in-migrating workforce could be accommodated by the recently upgraded town of Starbuck treatment facility. If necessary, the treatment plant could be further upgraded to increase capacity another 15%.

Use of onsite security services and implementation of emergency response plans and devices, coupled with the relatively small number of employees that would staff the facility, would minimize additional demands placed on local public services during normal plant operations. However, as stated earlier, local police, fire, and emergency medical facilities would not likely be able to meet the demands placed on them if there were a sizeable explosion, fire, or large industrial accident at the power plant.

Potential impacts to public services and utilities could be mitigated with the significant tax revenues that would be generated by the power plant. Tax revenue generation, in net present value, would include:

- gas taxes—$4.3 million annually, or $52.1 million over the 30-year plant life;
- property taxes—$47.3 million over the 30-year plant life (at $9.03/$1,000 for Columbia County and $3.20/$1,000 for Washington State, for a total of $12.23/$1,000); and
- sales taxes—$26.3 million over the 30-year plant life, composed of $3.5 million for Columbia County (at 1.00%) and $22.8 million for Washington State (at 6.50%).

Parks and Recreation

In general, recreational uses in the study area are likely to be negligibly affected as a result of use by the direct and indirect operational workforce. Lyons Ferry State Park and the Lyons Ferry Marina and Recreation Area are the closest facilities to the project site, and thus would likely experience minor additional use from this workforce.

4.12.3 Potential Mitigation Measures

4.12.3.1 Construction

It is unclear how and where the construction workforce would be housed. Depending on the final decision, there could be significant impacts to housing in Starbuck and Columbia County, and the resulting significant impacts to public services and utilities. Payments in lieu of taxes or additional mitigation fees might be required to mitigate these impacts. SPC should present their proposed plan to accommodate these workers in their Application for Site Certification. As part of the application, SPC should prepare a "worker community scenario" based on data such as population, presence of union halls and tradesmen, community time, local amenities, and other factors that would influence the origin and residence of the workforce. With these and other data, more specific mitigation measures can be identified.

SPC should develop and implement emergency preparedness plans, including coordination with local medical facilities and fire departments. These plans should include training of local fire departments for fighting natural gas fires and other types of emergencies that could occur at the generation plant.

4.12.3.2 Operation and Maintenance

During operation, the emergency preparedness plan noted above should be implemented. No other additional mitigation would likely be required during operation because of the minimal workforce and anticipated indirect labor in-migration, and the amount of tax revenues that would be generated to accommodate those impacts.

4.13 Cultural Resources

4.13.1 Existing Conditions

4.13.1.1 Regulatory Framework

Regulations established for the management of cultural resources include the Antiquities Act of 1906, Historic Sites Act of 1935, Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, the Archaeological Data Preservation Act (ADPA) of 1974, and the Archaeological Resources Protection Act (ARPA) of 1979, as amended. Also, there are specific laws that address Native American religious freedom and graves protection as defined by the Native American Graves Protection and Repatriation Act (NAGPRA) of 1990.

National Historic Preservation Act Section 106

Section 106 of the NHPA, as amended, directs that officials responsible for projects requiring federal permits take into account each project's effect on cultural resources that are eligible for listing in the National Register of Historic Places. The federal lead agency for the proposed action is responsible for initiating the Section 106 process and for consultation with the State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation (ACHP).

For this project, EFSEC and BPA will be responsible for initiating the Section 106 process and for coordinating with the SHPO, the ACHP, and the affected Native American Tribes. Because construction of the Starbuck Power Project requires SEPA compliance, project impacts to cultural resources must be considered in weighing the overall impact of the project on the environment. BPA actions to purchase and transport power are federal actions and will require compliance with Section 106 of the NHPA. This legislation, in part, requires that federal agencies "take into account the effect of the undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion" in the National Register. As the lead federal agency, BPA will be responsible for conducting government-to-government consultations with the Tribes. EFSEC and SPC may participate in the government-to-government consultations between the Tribes and the lead federal agency as appropriate.

The Section 106 process starts with considering the broad environmental consequences of an undertaking, then progressively narrowing the focus until specific problems can be identified, understood, and resolved. Identification and evaluation of the historic resources within a project's area of potential effect is the first step of the process. Subsequent steps involve consideration of effects, which may be followed by additional consultation with the SHPO and the ACHP, as well as other interested parties. The criteria used to evaluate the National Register eligibility of properties affected by federal agency undertakings are contained in 36 CFR 60.4 and are as follows:

"The quality of the significance in American history, architecture, archaeology, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and:

A. That are associated with events that have made a significant contribution to the broad patterns of our history or;

B. That are associated with the lives of persons significant in our past, or;

C. That embody the distinctive characteristics of a type, period or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguished entity whose components may lack individual distinction; or

D. That have yielded or may be likely to yield information in prehistory or history."

The 1992 NHPA amendments specify that properties of traditional religious and cultural importance, known as Traditional Cultural Properties, to a Native American Tribe may be determined to be eligible for inclusion on the National Register. A Traditional Cultural Property is defined as a property that is eligible for inclusion in the National Register because of its association with cultural practices or beliefs (e.g., traditions, beliefs, practices, lifeways, arts, crafts, and social institutions) of a living community that are rooted in that community's history and are important in maintaining the continuing cultural identity of the community. In carrying out its responsibilities under Section 106, a federal agency is required to consult with any Native American Tribe that attaches religious and cultural significance to any properties.

Native American Graves Protection and Repatriation Act

NAGPRA requires consultation with appropriate Native American Tribal authorities prior to the excavation of human remains or cultural items (including funerary objects, sacred objects, and cultural patrimony) on federal lands. NAGPRA recognizes Native American ownership interests in some human remains and cultural items found on federal lands and makes illegal (under most circumstances) the sale or purchase of Native American human remains, whether or not they derive from federal or Indian land. Repatriation, on request, to the culturally affiliated Tribe is required for human remains.

Cultural resources are of great significance to the people whose ancestors have used the land for many generations in prehistoric and historic times. The interests of the Tribes include the protection of Indian burials and other sacred sites, as well as the perpetuation of traditional activities such as hunting, fishing, and native plant gathering. This long-standing use of natural resources has resulted in lifeways that are integral to the maintenance of the Tribe's culture and which cannot be fully conveyed in federal policy.

4.13.1.2 Archaeology, Traditional Cultural Properties, and History

Archaeology

Previous archaeological investigations at or within 2 miles of the plant site have documented culturally sensitive sites, archaeological districts, and Traditional Cultural Properties. All of these sites reflect the unique and long history of Native American habitation along the banks and tributaries of the Snake River. Surrounding these water highways are cliffs and caves, floodplains, and terraces preserving one of the most significant archaeological regions in the entire state of Washington. For example, along the Palouse River, approximately 1.5 miles north of the project area, archaeological fieldwork has identified dozens of sites within what is known as the Palouse Canyon Archaeological District (PCAD). Rock art, sacred burial grounds, and pit house depressions have all been recorded within the PCAD. The Marmes Rock Shelter, located within this district, is located approximately 4 miles north of the plant site and is currently beneath water due to the increased level of the Palouse River after completion of the Lower Monumental Dam.

Archaeological evidence indicates continual yet sporadic occupation of the area for the last 10,000 years. CH2M Hill conducted cultural resource investigations in 1994 and 1999 to assist Northwest Power Enterprises, Inc. (NPE) in their studies associated with a power plant in the same location SPC has chosen for their power plant. CH2M Hill's cultural resource specialists conducted an intensive surface reconnaissance survey of the property in 1994 that produced negative findings (Scott and Bard 1994).

Bard et al. (2000) addressed the cultural phases associated with prehistoric occupation of the lower Snake River region in their assessment, which serves as the basis for this brief summary.

Human occupation can be divided into at least five cultural phases: Windust Phase (10,000 to 8000 before present [B.P.]), Cascade Phase (8000 to 5000 B.P.), Tucannon Phase (5000 to 2500 B.P.), Harder Phase (2500 to 700 B.P.), and Piqunin Phase (700 to 300 B.P.). Schalk's (1980) more generalized cultural history sequence, described below, provides a usable framework in which to place the prehistoric cultural resources of the study area into context:

- 12000 to 3500 B.P.—Early human adaptations to the postglacial Columbia Plateau appear to have been more dependent on terrestrial resources than those hunter-fisher-gatherers that followed. Hallmarks of lithic assemblages include large Cascade lanceolate points, edge-ground cobbles, girdled "bolas," burins, gravers, and a wide variety of scraping tools. In the Plateau, these assemblages lack milling stone or plant processing tools and fishing implements. Toward the end of this very long period of human history, however, plant processing technology is apparent in the form of manos, pestles, and food-grinding stones. Despite vague understanding of land use systems during this period, the general absence of domestic facilities such as longhouses or storage features and the small size of the recorded sites suggest relatively small and mobile groups of hunter-fisher-gatherers inhabiting the region. Assuming that over-wintering strategies were based primarily upon the hunting of large ungulates,

archaeological sites reflecting this phase of the annual subsistence cycle may have largely eluded the river-valley focus of most archaeological work.

- 3500 B.P. to 1730 A.D.—The appearance of structural remains of houses (pithouses), increasing evidence for dependence upon fishing, facilities for storage of food, cemeteries, and a wide variety of new projectile point types are probably the most salient characteristics that differentiate this period from that which precedes it. This period saw the beginning of winter sedentism. Topographic locations favored for settlement include the mouths of tributaries, floodplain deposits at the mouth of major canyons, islands, and locations in relative proximity to rapids or other constrictions in the channel of a river. While the appearance of cemeteries distinguishes this period from the preceding, mortuary practices defy simple characterization. The archaeological record of this time period reflects considerable cultural change; a general trend of nucleation into larger villages, changes in the house form, intra-site spatial organization, mortuary practices, and projectile points, all within a subsistence framework known from the ethnographic period.

- 1730 A.D. to 1850 A.D.—This period is distinguished primarily by the introduction of the horse into the region and the attendant cultural changes. The ethnographic adaptation, as it is known from various parts of the Plateau, probably applies to this interval. From an archaeological viewpoint, the period from 1730 to 1850 is the least known of the entire archaeological record of the region.

Near the Snake and Tucannon River confluence, the first formal archaeological survey of the lower Snake River was conducted in 1948 by the Smithsonian River Basin Survey. This survey recorded Site 45CO1 and produced artifacts suggesting an occupation spanning the last 2,000 years. Subsequent investigations at this site in 1965 and 1977 recorded 134 burials associated with the original locus and a newly identified site component, labeled 45CO1B. Evidence recovered from this site indicated that this area was occupied for thousands of years, possibly functioning as a winter village settlement.

Site 45CO21, Lyons Ferry Rockshelter complex, located less than 0.25 miles from the plant site, was recorded in 1975. Archaeologists recorded two shelters, the larger of the two measuring 20 feet deep by 40 feet wide, and conserved a total of five storage pits.

Traditional Cultural Properties

The vicinity of the plant site maintains a relatively high probability for unknown cultural resources for two primary reasons. First, there is a high density of archaeological sites recorded within 2 miles of the SPC property. Second, historical documents indicate the area experienced a moderate amount of military and overland travel activities for sustained periods in the late 19th and early 20th centuries. Additionally, Native American Tribes have indicated the area maintains characteristics of a Traditional Cultural Property. Recommendations for the eligibility of the property as a Traditional Cultural Property are pending. The proposed plant site lies in the traditional areas used by the Palouse, Yakima, Spokane, Umatilla, and Nez Perce Tribes. The Palouse Tribe is one of the 12 constituent

Tribes of the Confederated Tribes of the Colville Reservation (CCT), and the Umatilla Tribe is part of the Confederated Tribes of the Umatilla Indian Reservation (CTUIR).

In 1994, the CTUIR conducted a field visit/site tour with Tribal elders and submitted their findings and recommendations (Moura and Minthorn 1994). The CTUIR outlined two broad recommendations if the project were to go forward at the selected site chosen by SPC:

> *1. The property be formally submitted for a determination of eligibility to the National Register of Historic Places as a Traditional Cultural Property. This would necessitate:*
>
> - *Establishing a Government to Government relationship between the CTUIR, the developers, and governmental agencies involved with the proposed action. Only such a format can KVA, CH2M HILL, the Tribe, Columbia County and the State of Washington discuss such matters as zoning, treaty rights, and private property rights versus cultural resource laws.*
>
> - *Additional informant interviews.*
>
> - *Identification and involvement of all other concerned Native American groups.*
>
> *2. More attention be paid to the potential for buried cultural resources. This would necessitate:*
>
> - *Subsurface archaeological reconnaissance and monitoring of earth disturbing activities during construction. Subsurface archaeological reconnaissance should take the form of systematically placed shovel tests followed by backhoe trenching. Monitoring of construction should include a Tribal monitor in addition to that a professional archaeologist.*

In 1999, CH2M Hill, along with two CTUIR cultural resource staff, excavated 50 backhoe trenches on the 100-acre property to test both the preferred and alternate plant sites for the presence/absence of buried archaeological sites. In doing so, CH2M Hill addressed the Tribe's second issue raised in their 1994 report. This effort resulted in negative findings. (Bard et al. 2000.) None of the 50 backhoe trenches yielded any indications of archaeological remains.

In a letter addressed to CH2M Hill's cultural resources specialist on October 20, 2000, the Confederated Tribes of the Colville Reservation (CCT) requested relevant information on the eligibility of the study area as a TCP and wanted to formalize the government-to-government relationship as initially requested in the CTUIR 1994 report. BPA is currently formalizing the government-to-government relationship (Barnhart pers. comm.). CCT followed up their October letter with a December 4, 2000 letter addressed to Jones & Stokes, stating that they would be unavailable to attend the public meeting in Dayton, Washington (Fredin pers. comm.). They reiterated their cultural resource concerns surrounding the building of the proposed natural gas turbine within a potential TCP area and asked for resolution to these matters.

Historical Sites

Historically, the mouth of the Tucannon River was a strategic point during the latter half of the 19th century. An extension of historic Mullen Road crossed the Snake River just below the mouth of the Tucannon River and a small town, Grange City, was established at Site 45CO1 during the 1870s. Mullen Road is considered the most important eastern Washington wagon route and pack trail of the period 1860 to 1883. Twenty-five years earlier, the same area had been the site of a temporary military fort and was in a geographically important area during the Indian Wars of the 1850s. In 1858, Col. George Wright's Ninth Infantry Regiment constructed Fort Taylor to secure rear lines during military engagements with the Spokanes, Coeur d'Alenes and Palouses. Musket balls recovered from the most recent deposits at the site are thought to date from the occupation of Fort Taylor, and hundreds of historic artifacts were recovered that date from the building of Grange City. Several merchants and farmers connected with the grange movement in Columbia County constructed this small town as a shipping point on the Snake River. It was intended to fill a need for wheat transportation facilities, while at the same time providing competition with the Oregon Railroad and Navigation Company's virtual monopoly of warehousing and shipping. The town declined and disappeared when less expensive rail transport became available. These sites are now submerged by the water impounded by the Lower Monumental Dam.

Transportation in the study area is facilitated by two classic structures that cross the Snake River at the historic Lyons Ferry crossing. The Snake River Bridge at Lyons Ferry was originally built in 1927 to span the Columbia River at Vantage and was relocated to its current location in 1968 as part of a new secondary state highway. In its new location, the cantilever truss assumed a length of 2,040 feet, approximately 400 feet longer than its original length at Vantage. The southern end of the bridge is approximately 1.2 miles northwest of the plant site. The Snake River Bridge is a late example of the once common practice of reusing a truss at different locations. This bridge is representative of the cantilever truss, a truss form used in the construction of long-span bridges. It is significant as part of the major construction of long-span highway bridges that occurred in Washington State in the 1920s. The Snake River Bridge also demonstrates the flexibility and versatility of the long-span truss and its capabilities in serving more than one crossing.

The Joso Viaduct, a Union Pacific Railway holding, was built in 1914 over the Snake River at Lyons Ferry as part of an effort to reconstruct a line between Portland and Spokane by minimizing the line's grade and curvature, and subsequently shortening the distance by approximately 50 miles. The Joso Viaduct represents a bridge type that characterized American railroad construction during the late 19th and early 20th centuries. As the longest and one of the highest railroad viaducts remaining within Washington, the Joso Viaduct is significant in its demonstration of the magnitude of the structures that were necessary to traverse the rugged Washington terrain.

One historic structure within the town of Starbuck and within the project's area of potential effect was nominated for listing in the National Register of Historic Places in 1975. Located at the northeast corner of Main and McNeil Streets, the Bank of Starbuck is believed to have opened for business in 1904. The brick structure of the bank is one of several brick

commercial buildings dating from the turn of the century that remain standing along the downtown streets.

4.13.2 Environmental Impacts of Proposed Project

4.13.2.1 Construction

An adverse effect occurs when an undertaking may alter, directly or indirectly, the characteristics of a historic property that qualify the property for inclusion in the National Register, in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling and association. Adverse effects may include reasonably foreseeable effects caused by an action that may occur later in time, be farther removed in distance, or be cumulative.

Adverse affects on historic properties include, but are not limited to:

- physical destruction of or damage to all or part of the property;
- alteration of a property that is not consistent with the Secretary's Standards for the Treatment of Historic Properties (36 CFR Part 68) and applicable guidelines;
- change of the character of the property's use or physical features within the property's setting that contribute to its historic significance;
- introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features; and
- transfer, lease, or sale of property out of federal ownership of control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance.

Generation Plant

CH2M Hill concluded that the proposed power plant location discussed in their 1999 report, which includes the same location currently proposed by SPC for their power plant, would not impact any archaeological sites. This determination was based on their field reconnaissance and subsurface test excavations. CH2M Hill also indicated that archaeological monitoring would not be necessary as long as a discovery plan, approved by both the Washington SHPO and participating Native American Tribes, was implemented during construction. Agencies are encouraged to develop Programmatic Agreements pursuant to Sec. 800.14(b) to govern the actions to be taken when cultural resource properties are discovered during the implementation of an undertaking.

The unresolved claim of the site potentially being a Traditional Cultural Property needs to be handled on a government-to-government level. BPA, the federal agency handling tribal consultation, and the affected Native American Tribes, including both the Confederated

Tribes of the Umatilla Indian Reservation and the Confederated Tribes of the Colville Reservation, need to address the impacts of the placement of the power plant within the potential Traditional Cultural Property area. BPA entered into a Memorandum of Agreement (MOA) with 13 Tribes of the Lower Columbia River Basin (including the Umatilla and Colville Tribes) in April 1996. This existing MOA should provide the necessary framework to successfully enter into a programmatic agreement between the agency and affected Tribes.

Water Pipeline

The water pipeline route is primarily within a privately owned abandoned railroad right-of-way from the town of Starbuck to the end of the abandoned railroad bed near the generation plant site. Near the plant site, the pipeline would cross property that is owned by the Corps.

As indicated in the impacts associated with the construction of the proposed power plant, impacts related to the construction of the water pipeline could affect the potential Traditional Cultural Property identified by the Confederated Tribes of the Umatilla Indian Reservation. Again, government-to-government consultation is required to resolve this matter.

There exists a moderate probability to disturb unknown cultural resources during construction excavation along the proposed water pipeline right-of-way. This determination is based on several factors that include (1) the majority of the right-of-way is along an abandoned historic railroad bed, (2) proximity to several important ethnohistoric sites along the Tucannon and Snake Rivers, (3) a potential Traditional Cultural Property designation for the study area, (4) ample historic documentation for EuroAmerican use of the study area during the 19th and 20th centuries, and (5) the water pipeline alignment has not been surveyed for cultural resources. However, no known archaeological sites or historic structures would be impacted by installation of the water pipeline.

The proposed underground water pipeline that would terminate in Starbuck comes within 0.25 mile of the Bank of Starbuck. The Bank of Starbuck is eligible for listing in the National Register of Historic Places but would not be affected by the installation of this water pipeline.

4.13.2.2 Operation and Maintenance

Operation of the generation plant would not impact any known archaeological site or historic structure. Pending the determination of the proposed plant site's status as a Traditional Cultural Property, the operational impact to any potential ethnographic or ethnohistoric site cannot be assessed at this time.

4.13.3 Potential Mitigation Measures

Impacts to cultural resources would have to be mitigated following the procedures specified in 36 CFR 800. Class I and Class III inventories would be conducted on all federal and state lands and on private lands affected by federal undertaking. Cultural sites identified during those inventories should be avoided, where feasible. Mitigation measures would be

determined by BPA/EFSEC in consultation with the Washington SHPO, the ACHP, affected Native American Tribes, SPC, and the private landholders. If a large number of sites cannot be avoided, a programmatic agreement among the aforementioned parties may be developed.

An ethnohistoric study of the proposed project may be necessary to determine the site's potential for listing as a Traditional Cultural Property. If study results show that mitigation measures are necessary, appropriate mitigation would be developed by BPA/EFSEC in consultation with the parties mentioned above.

In addition to the Class I and III inventories, construction in areas where BPA/EFSEC believes there is a high potential for buried cultural deposits should be monitored by a qualified archaeologist. If historic or archaeological materials are discovered during construction, further surface-disturbing activities at the site would cease, and appropriate BPA/EFSEC personnel would be notified by SPC or their subcontractors to assure proper handling of the discovery by a qualified archaeologist. In absence of a programmatic agreement, any discovered historic properties would be subject to mitigation through data recovery.

4.14 Traffic and Transportation

4.14.1 Existing Conditions

4.14.1.1 Roadways and Traffic

The proposed generation plant would be located between the Snake River and SR 261. At the project site, SR 261 is a two-lane roadway with narrow (2- to 3-foot) gravel shoulders, drainage ditches, and no sidewalks. SR 261 is classified as a collector according to the Washington State Department of Transportation (WSDOT) road classification system. The posted speed limit is 50 mph. Approximately 1.2 miles north of the project site, the SR 261 Lyons Ferry Bridge crosses the Snake River. The bridge is load restricted: Truck traffic, other than single-axle trucks, is limited to 21,500 pounds per axle or less. SR 261 extends to and past the town of Starbuck, approximately 6 miles south of the plant site. The junction of SR 261 and US 12 is approximately 13 miles southeast of the plant site, and the junction of SR 261 and Palouse Falls Road is approximately 8 miles northwest of the plant site.

As noted in Section 3.2.2.4, SPC plans to install its water pipeline on the SR 261 bridge that crosses the Tucannon River. SPC would have to determine what WSDOT requirements would have to be followed to accomplish this.

A review of Average Daily Traffic (ADT) volumes from WSDOT data for SR 261 is shown in Table 4.13-1.

Table 4.13-1. Average Daily Traffic Volumes for SR 261

Road Segment	1996 ADT	1997 ADT	1998 ADT
SR 261 at the Junction with US Highway 12	440	450	430
SR 261 at the Junction with the Palouse Falls Road	290	290	290

Although daily traffic volumes provide a good indication of general travel patterns in the area, peak-hour traffic volumes are typically used for analysis since they reflect traffic conditions when congestion is greatest. The semi-isolated rural location of the Starbuck project and the relatively low ADT on SR 261 make this approach inappropriate. If future traffic volumes develop sufficiently during certain times in the day—either from existing

conditions or from operation of the developed facility—hourly traffic data would need to be collected and an analysis of traffic level of service (LOS) performed.[1]

The volume of truck traffic along SR 261 has not been determined. However, trucks are used to transport grain to the grain elevators (Columbia County Grain Growers) located south of and adjacent to the SPC property.

4.14.1.2 Waterborne, Air, and Rail Traffic

Recreational boats and barges operate on the Snake River in the vicinity of the plant site. A private marina is located on the Snake River, approximately 1.1 miles north of the SPC property. Barges are used to transport grain from the grain elevators located south of the SPC property.

There are no regional or municipal airports in the vicinity of the plant site. The nearest airport is located near Walla Walla, approximately 35 miles to the south. Small planes may use private runways at ranches or farms in the area; however, the frequency of this type of use is unknown.

An active Union Pacific Railroad line extends parallel to and several hundred feet west of SR 261 in the vicinity of the plant site. There are no known rail spurs, sidings, or loading facilities in the near vicinity of the plant site.

4.14.2 Environmental Impacts of the Proposed Project

4.14.2.1 Construction

Roadway Traffic

The plant site would be accessed from SR 261 via two proposed driveways. A complete road loop would be provided around the plant, with laterals to specific areas inside the plant as required. No new permanent roads are planned outside the plant road loop. All traffic associated with the proposed project would enter or leave the project site using SR 261. The two new driveway intersections would be regulated by stop signs to control vehicles entering onto SR 261.

Trucks would be used to deliver construction equipment and materials. Many of these trucks would have a gross vehicle weight as great as 105,500 pounds. The surface condition of the pavement near the site is good, and the delivery of construction materials and equipment is not expected to significantly degrade existing conditions. Trucks that exceed the load

[1] LOS is a measure of the ability of a given intersection to serve the traffic on the street system. LOS methodology was developed by the Traffic Research Board and is summarized in the Highway Capacity Manual (2000).

restrictions established for the Snake River Lyons Ferry Bridge north of the plant site on SR 261, would be limited to accessing the site on SR 261 from the south, by way of US 12.

It is not known how the combustion turbines and other large equipment would be transported to the site. However, it is likely that this equipment would be transferred from either a railroad car or barge to an oversized truck. This transport would have a short-term impact on traffic along SR 261 or other roadways used.

The peak onsite workforce would be approximately 550 people during a 3-month period; the average workforce for the remaining 21 months of construction would be approximately 300. The workforce in either circumstance may add significantly to the ADTs for the existing road system at and near the plant site, and if SPC developed a work camp, in the vicinity of the camp. The nature and extent of these effects would depend on where the workforce resides and how the workers commute to the site, as well as the number of road-based deliveries of materials and equipment to the site. In their Application for Site Certification, SPC should describe the anticipated commuting patterns based on expected sources of workers and indicate whether or not intersection improvements are warranted to accommodate transit by the construction workforce during the 2-year construction period. The workers' vehicles would probably be parked on the site property to the north of the existing BPA transmission lines.

Construction of the water pipeline would require a workforce of approximately 40 and would be completed over a period of approximately 2 to 3 months. Workers would likely park their personal vehicles, trucks, and equipment on the abandoned railroad bed to the extent possible, in the town of Starbuck near the water well, or at locations between the town and the plant site, depending on which portion of the 6-mile pipeline was under construction at the time. Although a more detailed construction management plan is needed to evaluate traffic impacts due to pipeline construction, it is anticipated that this activity would result in a minor and short-term impact on local traffic.

Waterborne, Rail, and Air Traffic

Construction materials for the facility most likely would not require rail transport. However, large primary components of the facility (such as turbines) may well be delivered by rail or barge and transferred to trucks. Such transport is anticipated to be incidental, and the transfer of components to trucks for delivery onsite would likely occur at existing local rail spurs or barge facilities. A crane could be used to offload equipment onto trucks that would then use SR 261 to transport the equipment to the site. If rail transport is used, it is expected that Union Pacific Railroad would be able to coordinate transport and unloading activities without affecting their system. It is unknown what reasonable options may be under consideration for barge transport.

The plant would not need waterborne or air transport during construction of the facilities, and there would be no impacts to either mode of transport.

4.14.2.2 Operation and Maintenance

Roadway Traffic

The Starbuck Power Plant is expected to operate 24 hours per day, 7 days per week, with a total labor force of 35 people. Some workers would work standard office hours, while others would work 12-hour shifts.

Traffic would enter the site from SR 261. Travel demand on this road when the proposed facility is operational would be composed of three elements:

- existing traffic;
- future non-project traffic; and
- forecast project-generated traffic.

Existing traffic volumes were discussed and tabulated earlier. Future non-project traffic growth includes other projects that are planned but not yet operational, the effects of population growth, and changes in traffic patterns due to street improvements or operations. However, there are no known projects in the vicinity that would add to future traffic volumes. Background growth in traffic volumes is projected to remain unchanged or increase at a very low rate each year.

Project-generated traffic volumes would be produced by employees traveling to and from the site as well as truck traffic generated by the operation of the facility. Project-generated traffic volumes would be minimal, with no more than about 15 individuals expected to be present onsite at any point in time. Although specific traffic generation data will be provided by SPC in their Application for Site Certification, the likely traffic increase would be low and the cumulative volumes on SR 261 are expected to remain reasonably low relative to the capacity of the roadway.

Waterborne, Air, and Rail Traffic

Operation of the facility would not require waterborne, air, or rail transport except for the possible and unusual need to replace a major piece of equipment. In that case, rail transportation may be used but is not expected to negatively affect the rail system.

The exhaust stacks would have warning lights installed and operating in accordance with the requirements of the Federal Aviation Administration. Although the presence of the plant and the stacks would increase the potential for airplane collisions, air traffic in the area is likely low since the nearest airport is 35 miles away and there are no major destination areas in the vicinity of the plant site. The two 500-kV transmission lines which traverse the site and the river represent an existing hazard, and it is not expected that the plant would substantially increase that risk. As a result, it is not anticipated that the plant would result in a significant impact to air traffic.

4.14.3 Potential Mitigation Measures

Additional mitigation may be required depending on where the workforce members are housed and how they commute to the site. These factors may significantly affect the ADTs of the existing road system at the plant site and near it, as well as in the area(s) where the workforce resides.

4.15 Health and Safety

4.15.1 Existing Health Risks

To date, the plant site has been primarily used for grazing. Thus, no industrial soil contamination is expected on the site itself.

Water would be supplied to the site via a new 6-mile-long pipeline from the town of Starbuck. Because the water pipeline, for most of its length, would be placed in an abandoned railroad bed, the potential exists for contamination to be present in the ballast due to past activities associated with railroad operation and maintenance. A Phase II Environmental Assessment may be needed to establish the level of contamination present in the railroad bed.

A 36-inch-diameter natural gas pipeline is located approximately 200 feet from the southwest corner of the project site and would serve as the source of natural gas for the project.

Two BPA 500-kV transmission lines currently cross the project site. An unquantified electromagnetic field (EMF) is associated with those lines. Power from the project would enter the transmission grid via these existing 500-kV lines.

The town of Starbuck has a volunteer fire department with a staff of 25, but no medical facilities. Dayton has a volunteer fire department with 26 firefighters. The Waitsburg volunteer fire department, with a staff of 35, is located in Walla Walla County, but has a joint operating agreement with Columbia County. The nearest medical facilities are in Dayton where the General Hospital has 28 acute-care beds. Enhanced 911 is available countywide.

4.15.2 Environmental Impacts of the Proposed Project

4.15.2.1 Construction

During construction, the proposed project would include measures designed to minimize or eliminate the release of chemicals, petroleum products, hazardous waste, other types of wastes, and other materials that could negatively affect environmental conditions. These measures are summarized below.

Proposed Protection Measures

The following measures have been proposed by SPC and are expected to be included in their Application for Site Certification.

Chemicals, petroleum products, and other materials would be used and stored on the plant site. Best Management Practices, such as good housekeeping measures, inspections,

containment facilities, and spill prevention practices, would be used to limit contact between stormwater and potential pollutants.

Construction equipment would require diesel fuel and oil on a regular basis. All onsite vehicles would be monitored for leaks and receive regular preventative maintenance to ensure proper operation and reduce the chance for leaks. Elevated fuel tanks would be located in designated areas for vehicle refueling. The fuel tanks would be located within an earthen berm with an oil-proof liner sized to contain the volume released by failure of the largest tank within the berm. The actual refueling area would be immediately adjacent to the berm and would be graded in order to simplify cleanup of small spills that occur during vehicle refueling. No "topping off" of fuel tanks would be allowed, further reducing the possibility of spills. Petroleum products would be stored in clearly labeled and tightly sealed containers or tanks. All petroleum products stored in quantities greater than 55 gallons would be stored within temporary lined containment dikes to capture and hold accidental spills. Asphalt used onsite would be applied according to the manufacturer's recommendations. If fuel or oil spills do occur, the resultant soil contamination would be removed and disposed at an approved disposal site in accordance with applicable regulations.

Portable sanitation units would be used during construction of both the power plant and the water pipeline. These units would be maintained on a regular basis, and a licensed sanitary waste management contractor would collect wastes from units for disposal in accordance with applicable regulations.

All hazardous waste materials would be disposed of according to local or state regulation or the manufacturer's recommendations. Construction personnel would be instructed regarding the regulations and recommendations and the Construction Manager would be responsible for their implementation.

Fertilizers would be applied as recommended by the manufacturer. After application, the fertilizer would be worked into the soil to limit exposure to stormwaters. Fertilizers would be stored at the plant site in a covered area or in water-tight containers. Any partially used bags or containers would be properly sealed and stored to avoid spills or leaks.

All paint containers would be tightly sealed and properly stored to prevent leaks or spills. Paint would not be discharged to the stormwater system. Unused paints would be disposed of according to applicable local or state regulations. Spray painting would not occur on windy days and a drop cloth would be used to collect and dispose of drips and over-spray associated with all painting activities.

Concrete trucks would be required to discharge surplus concrete or drum washwater on the site in a manner that prevents contact with stormwaters discharged from the site. Dikes or barriers would be constructed around these areas to contain these materials until stable, at which time the materials would be disposed of in a manner acceptable to the Construction Manager.

All construction waste materials would be collected, deposited, and stored in metal dumpsters provided by a licensed solid waste management contractor; the waste management contractor would remove the dumpsters and dispose of the material in accordance with applicable

regulations. Construction waste materials would not be buried onsite. Burning would be conducted in accordance with local or state regulations. All site personnel would be instructed regarding the proper waste disposal procedures by the Construction Manager.

During construction of the water pipeline, it is recommended that SPC conduct contaminant testing of excavated railroad ballast materials. If contamination is encountered in the excavated material, this material would be separated from the uncontaminated material, removed from the construction area, and disposed of by an approved contractor in accordance with applicable regulations.

Potential Impacts

By following the above measures, the potential for uncontrolled releases from the site would be low, and there would not be a significant impact on health and safety during construction.

4.15.2.2 Operation and Maintenance

During operation, the proposed project would include measures designed to minimize or eliminate the release of chemicals, petroleum products, hazardous waster, other types of wastes, and other materials that could negatively affect environmental conditions. These measures are summarized below.

Proposed Protection Measures

Because the project would connect to existing BPA 500-kV transmission lines crossing the site, no additional exposure to EMF due to use of these transmission lines would occur offsite. Project operations personnel and visitors to the site would be exposed to the EMF of the transmission lines.

To provide transmission reliability for the electricity generated by the project, BPA would install an additional 500-kV line from the plant site to the Lower Monumental Dam switchyard, approximately 15 miles to the west. Although the location and design of the transmission line are still under investigation, transmission of power through these lines would increase EMF along the transmission line route. This issue would be further addressed in the SPC Application for Site Certification and in the Environmental Impact Statement to be jointly issued by EFSEC and BPA.

Each HRSG would be equipped with an SCR system that uses ammonia injection to minimize the production of NO_x. The aqueous ammonia storage and transfer system would consist of skid-mounted aqueous ammonia vaporizing and dilution equipment located adjacent to each SCR, and common area consisting of an ammonia storage tank, transfer pumps, vaporizer, associated piping, and controls. A truck unloading station would be located at the ammonia storage tank, which would include a spill containment facility for both the truck unloading station and the ammonia storage tank.

Only natural gas would be utilized as fuel for the turbines. Thus, no spent fuel wastes, such as ash, would be generated.

Section 3.2.4.4 of this EA discusses the proposed fire protection provisions. Fire fighting, once the facility becomes operational, would be accomplished through a combination of activation of the installed systems and actions taken by project operations personnel in accordance with the appropriate emergency response plan.

All potentially contaminated wastewaters collected in the combustion turbine (CT)/HRSG area, with the exception of CT washwater, would be treated by an oil separator. CT washwater drains and chemical drains would be routed to the chemical sump. These wastes may contain surfactants which would interfere with oil/water separation. Thus, the sump would be monitored and, upon reaching the high level, these wastes would be pumped to a truck for offsite disposal in accordance with applicable regulations.

A mobile demineralization system is proposed to provide the maximum cycle makeup requirements. Mobile demineralizers would be trucked offsite for regeneration and corresponding regeneration waste disposal.

Storm drains would be segregated into areas which could be contaminated and those that would not. Discharge of uncontaminated stormwater would be to the retention basin and tile field.

All areas housing chemicals would be protected with concrete containment areas. All indoor areas with potential oil or lubrication spills would also be protected by concrete containment structures, with drains directed to a second oil/water separator.

The project would not include a backup power system. As a result, there would be no need to store a large volume of diesel fuel onsite. Fuel oil storage onsite during operation is expected to be limited to the diesel fuel stored for the diesel pump used for fire suppression, known as the diesel firewater pump. A concrete containment area located beneath the tank and the filling hook-up would be provided to capture and contain filling spills and overfills. A drain line would connect the containment to a separate holding volume, ensuring spilled diesel fuel would not reach the stormwater collection system.

Potential Impacts

By following the above measures, the potential for uncontrolled releases from the site would be low, and there would not be a significant impact on health and safety during normal operation.

Two primary types of major accidents could occur that would pose a health and safety risk to individuals in nearby areas: (1) rupture of the common ammonia storage tank, and (2) a natural gas explosion and fire, either within the generation plant or due to a pipeline rupture. SPC will be required to include emergency preparedness plans in their Application for Site Certification. The plans would be designed to respond to these and other potential catastrophic situations in a manner that would minimize risks to the public to the extent possible. If a major accident were to occur at the site, those at primary risk would include

workers and visitors on the plant site, workers at the adjacent grain elevators (south of the site), and those traveling along SR 261 adjacent to the site. Due to the remote location of the plant and the low volume of traffic along SR 261, major accidents at the plant would not threaten a large population.

4.15.3 Potential Mitigation Measures

In addition to the protective measures discussed above, the following mitigation measures are suggested:

- Construction equipment should maintain proper clearance from the existing power lines located on the SPC property.
- A Spill Prevention, Control, and Countermeasures (SPCC) Plan should be developed and implemented for the facility in accordance with applicable regulations.
- A plan should be developed for periodic inspections and leak surveys of the gas pipeline.
- SPC should develop and implement emergency preparedness plans, including coordination with local medical facilities and fire departments. These plans should include training of local fire departments for fighting natural gas fires and other types of emergencies that could occur at the generation plant.

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